2011 Project Abstract
For the Period Ending June 30, 2014

PROJECT TITLE: **Scientific and Natural Areas Acquisition and Restoration**

PROJECT MANAGER: Margaret (Peggy) Booth
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FUNDING SOURCE: Environment and Natural Resources Trust Fund)
LEGAL CITATION: M.L. 2011, First Special Session, Chp. 2, Art.3, Sec. 2, Subd. 04e

APPROPRIATION AMOUNT: $1,640,000

Overall Project Outcome and Results

The biologically significant 900-acre Badoura Jack Pine Forest SNA was acquired in part through appropriation. Twenty-two conservation easement baseline property reports at 11 SNAs are completed. The SNA Strategic Land Protection Plan has been completed which prioritizes places of ecological importance for protection as SNAs and by partners.

Habitat restoration and enhancement actions are increasing the quality of habitat on SNAs through achieving: restoration of about 30 acres at 4 SNAs; woody invasive species control on 610 acres at 19 SNAs, herbaceous invasive species treatment on 487 acres at 33 SNAs, and installation of invasives control bootbrush kiosks at 6 SNAs; about 36 miles of burn breaks at 21 SNAs and completion of 1,190 acres of prescribed burns at 25 SNAs; and site development work (e.g. entry and boundary signs, new gates, and site cleanup) at 35 SNAs. Conservation Corps Minnesota was involved in 51 of these projects. Substantial monitoring was completed of pollinators at 10 SNAs, of snakes at 1 SNA, and of native plant communities at 2 SNAs.

The public's and youth involvement in SNAs and their knowledge and skills about biodiversity conservation has significantly increased through the SNA Outreach Initiative started through this appropriation. About 215 SNA events were held with over 3300 participants and 124 volunteer site stewards have committed to help care for SNAs. A broad range of communications tools have engaged people in sharing information about SNAs. Electronic communications achievements include: a new quarterly electronic newsletter with over 2600 subscribers, a new SNA Facebook page with over 1,100 likes and monthly reach of 12,000 (including many user posts), and a significantly improved new SNA webpage. Print communications created and distributed include: a statewide map with location and directions to SNAs, a new North Shore SNA guide, 3 series of pocket cards, and site-specific factsheets.

Project Results Use and Dissemination

Dissemination is primarily achieved through the upgraded SNA webpage on the DNR website: http://www.mndnr.gov/snas. The SNA Strategic Land Protection Plan is also disseminated through this website: http://www.dnr.state.mn.us/eco/sna/plan.html. All volunteer events are listed at the webpage. Volunteer site stewards submit periodic reports via a generic SNA email address sna.dnr@state.mn.us created through this appropriation for a broad variety of constituent communications. An SNA Facebook page provides SNA visitors a place to report and share observations and photographs. Ten issues of the quarterly electronic Nature Notes newsletter were emailed through govdelivery – with over 2600 current subscribers.

A statewide color map locating all SNAs (with directions to all sites and ENRTF acknowledgement on the back) has been designed, 5000 copies printed, and nearly all copies distributed through the DNR Information Center, at DNR region and area offices and state parks, at the State Fair, and through SNA event co-sponsors – with primary emphasis on facilities/organizations that are near SNAs and are cooperating on sponsoring SNA events. A color poster-booklet on "The Ten Best Places of the North Shore: A Visitor's Guide to North Shore Scientific and Natural Areas" was printed and distributed through a combination of this appropriation and federal Coastal Zone Management funding. Each year series of new business card-size "pocket cards" each featuring 1 SNA (and incorporating a QR code through which a smart phone with camera can directly connect to the SNA web) have been printed and almost all cards for the 32 SNAs produced to date have been distributed through the State Fair, DNR Info Center, and many DNR events.

Environment and Natural Resources Trust Fund (ENRTF)
M.L. 2011 Work Plan Final Report

Date of Status Update: **9/8/2014; updated 10/15/14**
Date of Next Status Update: **Final Report**
Date of Work Plan Approval: 6/23/2011
Project Completion Date: 6/30/2014 **Is this an amendment request? ____**

Project Title: Scientific and Natural Areas Acquisition and Restoration

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Location:

Counties Impacted: Statewide

Ecological Section Impacted: Lake Agassiz Aspen Parklands (223N), Minnesota and Northeast Iowa Morainal (222M), North Central Glaciated Plains (251B), Northern Minnesota and Ontario Peatlands (212M), Northern Minnesota Drift and lake Plains (212N), Northern Superior Uplands (212L), Paleozoic Plateau (222L), Red River Valley (251A), Southern Superior Uplands (212J), Western Superior Uplands (212K)

Total ENRTF Project Budget:		
	ENRTF Appropriation $:	1,640,000
	Amount Spent $:	1,636,758
	Balance $:	3,242

Legal Citation: M.L. 2011, First Special Session, Chp. 2, Art.3, Sec. 2, Subd. 04e

Appropriation Language:
$820,000 the first year and $820,000 the second year are from the trust fund to the commissioner of natural resources to acquire lands with high-quality native plant communities and rare features to be established as scientific and natural areas as provided in Minnesota Statutes, section 86A.05, subdivision 5, restore parts of scientific and natural areas, and provide technical assistance and outreach. A list of proposed acquisitions must be provided as part of the required work program. Land acquired with this appropriation must be sufficiently improved to meet at least minimum management

standards, as determined by the commissioner of natural resources. This appropriation is available until June 30, 2014, by which time the project must be completed and final products delivered.

I. PROJECT TITLE: Scientific and Natural Area Acquisition and Restoration

II. FINAL PROJECT SUMMARY:

The biologically significant 900-acre Badoura Jack Pine Forest SNA was acquired in part through appropriation. Twenty-two conservation easement baseline property reports at 11 SNAs are completed. The SNA Strategic Land Protection Plan has been completed which prioritizes places of ecological importance for protection as SNAs and by partners.

Habitat restoration and enhancement actions are increasing the quality of habitat on SNAs through achieving: restoration of about 30 acres at 4 SNAs; woody invasive species control on 610 acres at 19 SNAs, herbaceous invasive species treatment on 487 acres at 33 SNAs, and installation of invasives control bootbrush kiosks at 6 SNAs; about 36 miles of burn breaks at 21 SNAs and completion of 1,190 acres of prescribed burns at 25 SNAs; and site development work (e.g. entry and boundary signs, new gates, and site cleanup) at 35 SNAs. Conservation Corps Minnesota was involved in 51 of these projects. Substantial monitoring was completed of pollinators at 10 SNAs, of snakes at 1 SNA, and of native plant communities at 2 SNAs.

The public's and youth involvement in SNAs and their knowledge and skills about biodiversity conservation has significantly increased through the SNA Outreach Initiative started through this appropriation. About 188 SNA events were held with 2,745 participants and 124 volunteer site stewards have committed to help care for SNAs. A broad range of communications tools have engaged people in sharing information about SNAs. Electronic communications achievements include: a new quarterly electronic newsletter with over 2600 subscribers and a significantly improved new SNA webpage. Print communications created and distributed include: a statewide map with location and directions to SNAs, a new North Shore SNA guide, 3 series of pocket cards, and site-specific factsheets.

III. PROJECT STATUS UPDATES:

Project Status as of March 1, 2012:
Four acquisition projects at three locations to be acquired all or in part with this appropriation are underway: one offer has been made, two other acquisitions are being appraised, and a federal grant application has been submitted to pay for part of 4th project. The SNA Strategic Plan project has been initiated which will apply a GIS-computer based system to prioritize land acquisition and protection of rare resources. Habitat restoration and enhancement project activities completed to date include: seed collection from 9.5 acres for one prairie reconstruction at that site; wood invasive species control on 2.3 acres at 2 SNAs and herbaceous invasive species treatment on about 0.1 acre at 1 SNA; 0.75 miles of burn breaks at two SNAS; installation of signs at 4 SNAs and gates at 2 SNAs; and prescribed burn and other project plans for spring 2012 work are being prepared. Web-based information and resources are being implemented to encourage and support SNA volunteers, site stewards, visitors, and others interested in SNAs. To date, 16 events have been held with about 300 participants (made possible all or in part with this appropriation) and 18 new or returning site stewards have committed to help care for SNAs. Among tools to recruit site stewards was a notice on the ENRTF facebook and twitter sites which leads people to the new SNA site steward webpage.

Project Status as of December 31, 2012:
Offers were made and rejected by the landowner on two acquisition projects and a 3rd project was terminated by the landowner; a 4th project was also halted when federal funding was not received towards its acquisition. Alternative acquisitions are the being explored. One conservation easement baseline property report is completed. The SNA Strategic Plan project is well underway – with progress made on a GAP analysis of protection status of native plant communities and GIS-computer

assessments of conservation priority areas by ecological subsection. Habitat restoration and enhancement project activities completed to date include: seed collection from more than 40 acres for two prairie reconstructions; wood invasive species control on 336 acres at 4 SNAs, herbaceous invasive species treatment on 5 acres at 6 SNAs, and installation of invasives control bootbrush kiosks at 3 SNAs; about 14 miles of burn breaks at 13 SNAs and completion of 144 acres of prescribed burns at 2 SNAs; installation of signs at 7 SNAs and gates at 3 SNAs; and prescribed burn and other project plans for spring 2012 work are being prepared. Web-based information and resources are being implemented to encourage and support SNA volunteers, site stewards, visitors, and others interested in SNAs. To date, 114 events have been held with about 1000 participants (made possible all or in part with this appropriation) and 95 new or returning site stewards have committed to help care for SNAs.

Project Status as of March 1, 2013:
An acquisition of two parcels at Forestville-Saxifrage Hollow are underway which may be acquired with this funding; additional acquisitions are the being explored. One conservation easement baseline property report is completed. Two preliminary results of the SNA Strategic Plan project have been completed: a GAP analysis of protection status of native plant communities and GIS-computer assessments of conservation priority areas by ecological subsection. Habitat restoration and enhancement project activities completed to date include: seed collection from more than 40 acres for two prairie reconstructions of which 10 acres have been seeded with portions of this seed; wood invasive species control on 363 acres at 4 SNAs, herbaceous invasive species treatment on 5 acres at 6 SNAs, and installation of invasives control bootbrush kiosks at 3 SNAs; about 14 miles of burn breaks at 13 SNAs and completion of 144 acres of prescribed burns at 2 SNAs; installation of signs at 7 SNAs and gates at 3 SNAs; and prescribed burn and other project plans for spring 2012 work are being prepared. A statewide map with location and directions to all SNAs has been printed and is being distributed; the five issues of a new quarterly SNA *Nature Notes* e-newsletter have been distributed to an audience now exceeding 1400 people. To date, 120 events have been held with over 1000 participants (made possible all or in part with this appropriation) and 95 new or returning site stewards have committed to help care for SNAs.

Project Status as of September 19, 2013:
Acquisition is proposed to be targeted to one or more of three new large acquisitions, because offers made to date through this appropriation have been rejected by landowners. Twenty-two conservation easement baseline property reports at 11 SNAs are completed. Three preliminary results of the SNA Strategic Plan project have been completed: a GAP analysis of protection status of native plant communities, GIS-computer assessments of conservation priority areas by ecological subsection, and a draft SNA Candidate Site Evaluation Guide and Form; descriptions and maps of Opportunity Areas are under development. Habitat restoration and enhancement project activities completed to date include: locally collected seed has been planted on about 20 acres at 3 SNAs (2 prairie reconstructions and 1 rehabilitation of an existing prairie); wood invasive species control on 402 acres at 7 SNAs, herbaceous invasive species treatment on 218 acres at 19 SNAs, and installation of invasives control bootbrush kiosks at 5 SNAs; about 15 miles of burn breaks at 13 SNAs and completion of 370 acres of prescribed burns at 11 SNAs; and site development work (e.g. entry and boundary signs, new gates, and site cleanup) has been done at 20 SNAs. A statewide map with location and directions to all SNAs has been printed and is being distributed; a new series of pocket cards were produced and distributed; additional SNA website improvements implemented; 9 SNA factsheets developed and distributed; 6 issues of a new quarterly SNA *Nature Notes* e-newsletter have been distributed to an audience now exceeding 1790 people. To date, 170 events have been held with over 1600 participants (made possible all or in part with this appropriation) and 109 volunteer site stewards have committed to help care for SNAs.

Project Status as of March 1, 2014
Acquisition of a large property containing S1-S2 (state endangered) native jack pine woodland native plant community will be completed with about 196 acres (out of 560 acres in Phase 1 and 900 acres in total) acquired through this appropriation. Twenty-two conservation easement baseline property reports at 11 SNAs are completed. Three preliminary results of the SNA Strategic Plan project have been

completed: a GAP analysis of protection status of native plant communities, GIS-computer assessments of conservation priority areas by ecological subsection, and the SNA Candidate Site Evaluation Guide and Form; descriptions and maps of Opportunity Areas are regional review by ecologists and land managers. Habitat restoration and enhancement project activities completed to date include: locally collected seed has been planted on about 20 acres at 3 SNAs (2 prairie reconstructions and 1 rehabilitation of an existing prairie); wood invasive species control on 408 acres at 9 SNAs, herbaceous invasive species treatment on 275 acres at 19 SNAs, and installation of invasives control bootbrush kiosks at 5 SNAs; about 26 miles of burn breaks at 16 SNAs and completion of 437 acres of prescribed burns at 12 SNAs; and site development work (e.g. entry and boundary signs, new gates, and site cleanup) has been done at 23 SNAs. A statewide map with location and directions to all SNAs has been printed and is being distributed; a new series of pocket cards were produced and distributed; additional SNA website improvements implemented including new detailed maps for 10 SNAs; 9 SNA factsheets developed and distributed; 8 issues of a new quarterly SNA *Nature Notes* e-newsletter have been distributed to an audience now exceeding 2,130 people. To date (through Jan 2014 - with subsequent SNA events being done through the ML2012 appropriation), 200 events have been held with over 2400 participants (made possible all or in part with this appropriation) and 116 volunteer site stewards have committed to help care for SNAs.

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Protection of Sites of Biodiversity Significance

Description: The SNA Program will protect and buffer MCBS-recommended sites of biodiversity significance by acquisition and SNA designation of about 80 acres. To be acquired and designated as SNA, the site must be recommended for SNA designation by the Commissioner's Advisory Committee (CAC) and in an Ecological Evaluation report which serves as the site's baseline assessment for fee acquisitions and AND must be part of a MCBS-mapped biodiversity significance site (or be a geological feature of statewide significance). All such sites are predominantly MCBS-mapped native plant communities and contain habitat for rare species and Species of Greatest Conservation Need. In addition, SNA staff uses criteria, such as landowner readiness and urgency, degree of threat, and partnership opportunities, to rank which recommended sites are currently pursued. The list of priority projects for this is the M.L. Acquisition/Restoration List table (attached). DNR may request to add other qualifying sites to the list with additional MCBS recommendations and changes in landowner interest, acquisition opportunity, or threats. Most acquisition will be of fee title, but if more appropriate for ongoing management and use, acquisition will be of an SNA program-administered conservation easement with SNA designation.

Conservation easement baseline reports and monitoring would be done on about 10 sites, including sites, if any, acquired through conservation easement with these funds. As of May 2011, the SNA Program manages 20 SNA conservation easements at 12 designated SNAs. One of these has a full baseline property report and ~11 baseline reports need to completed.

In cooperation with MCBS, the SNA Long Range Plan will be updated and GIS tools developed and applied to evaluate and prioritize candidate sites and to implement the State Wildlife Action Plan (SWAP). This process will include: a) identification and categorization of natural features (specifically native plant communities, rare plants, animals, and geological features, and areas of biodiversity significance) most important for protection in Minnesota and each of its primary landscapes; b) mapping (using geographic information systems – GIS) of current locations and protection status of features, in particular whether within existing SNAs, other state units, and selected other categories of ownership using available data; c) refinement of criteria for prioritizing sites as candidates for SNA designation; 4) identification of candidate areas for land protection – primarily through SNA designation, but considering other land protection tools (including the SNA Program's Natural Area Registry) – and their priority rating; and 5) evaluation and revision of the SNA Long Range Plan with input from the Commissioner's Advisory Committee. This will be primarily an ecological prioritization process that will

also take into account and be coordinated with the work on SWAP, climate change, watershed approaches, and cost-benefit analyses addressing public use, access, management costs, etc.

Summary Budget Information for Activity 1:

ENRTF Budget: $ 679,629
Amount Spent: $ 676,550
Balance: $ 3,079

WORK PLAN AMENDMENT APPROVED September 11, 2014 (see below).

Activity Completion Date:

Outcome	Completion Date	Budget
1a. acquisition as SNA of ~80 acres of high quality habitat	6/30/14	$504,800
1b. baseline property reports & monitoring for ~10 conservation easements	10/31/13	$30,200
1c. SNA Long Range Plan update & strategic prioritization tools	3/1/14	$198,500

Activity Status as of March 1, 2012:
1a. Acquisition: Four acquisition projects at three locations to be acquired all or in part with this appropriation have been initiated and are moving forward; one other project was initiated, but is not proposed for this appropriation at this time. The 13-acre addition to the **Boltuck-Rice Forever Wild SNA** (Itasca County) is being appraised (to be paid fully with this appropriation). An offer is being made on a 367-acre addition to the **Englund Ecotone SNA** (Benton County) and a second 80-acre addition is being appraised (this appropriation will contribute to one or both of these projects). A federal Coastal Zone Management-NOAA grant application has been submitted that proposes to acquire a conservation easement and designate 390 acres as the **proposed Magney-Snively SNA** (St. Louis County) using a combination of this appropriation and the federal funding. Acquisition of the proposed Art Lake Hardwood Ridges SNA (Lake County) was initiated; however, the strategies for protecting land in this location needed to change because of underlying mineral interests in the area; options are being discussed with the county.

1b. Baseline Property Reports and Monitoring: An RFP is expected to be issued in spring 2012 to contract for baseline property report preparation.

1c. SNA Strategic Plan: A full time unclassified planner was hired starting January 3, 2012 to lead and staff the SNA Strategic Planning Project. (Initiation of this project was delayed by six months, in part due to state shutdown and the hiring process.) The first two months of the Project has focused on collecting background information and reviewing potential protocols. This includes: collating existing statewide data and mapping, conducting preliminary investigations into other strategic planning efforts implemented by Natural Area Programs across the country; and reviewing goals, objectives, potential inputs, outputs, and target goals. Review of other planning efforts has been particularly helpful in that a variety of globally-used GIS-based conservation prioritization tools were found to be used by conservation planning organizations. The SNA's counterpart program in Florida uses the most prevalent computer program, Marxan, for updates of its strategic conservation plan every six months. A computer program such as Marxan is particularly useful as it factors in parameters such as rare species habitat, unique features, existing protection and buffering, impacts to land uses such as mining and forestry, and land costs into the prioritization. It runs up to a million iterations to find the most efficient prioritization of land protection that minimizes impacts to financial (acquisition/management), economic (ag/mining/forestry), and environmental resources. The Strategic Planning effort is currently in the middle of evaluating the software programs to determine their potential application to Minnesota's efforts. The planner is working closely with DNR expert advisory group and will be using an advisory committee composed of experts from within and outside the DNR to help determine inputs, and target protection levels. The internal advisory group has been very supportive of planning efforts conducted

to date. Concurrently, reformatting of data has also commenced so that it can be used within the computer programs' formats.

Activity Status as of January 15, 2012:
1a. Acquisition: None of the four primary acquisition project initiated with this funding are going forward at this time. An offer was made and rejected by the private landowner for a 13-acre addition to the **Boltuck-Rice Forever Wild SNA** (Itasca County). The offer on a 367-acre addition to the **Englund Ecotone SNA** (Benton County) was rejected by the private landowners and the landowner of second 80-acre addition sold it to another private landowner before an appraisal was completed. The federal grant application was unsuccessful for the first phase of the **proposed Magney-Snively SNA** (St. Louis County so this project in on indefinite hold. Acquisition of a 40-acre tax forfeit parcel at Boltuck-Rice Forever Wild SNA is being considered for this funding, but will be deferred pending additional information being provided to the LCCMR for consideration. Acquisition of two parcels at **Forestville-Saxifrage Hollow** (Fillmore County) is being initiated in cooperation with The Nature Conservancy using LSOHC appropriation(s) and may also include this appropriation.

1b. Baseline Property Reports and Monitoring: Two contractors are in the process of preparing 22 baseline property reports for easements at twelve SNAs. One baseline is complete; drafts of more than half of the baseline reports have been submitted to the DNR and are under review by staff.

1c. SNA Strategic Plan: The project planner has conducted the initial GAP analysis of Native Plant Communities already protected within by SNAs. The analysis is currently being expanded to all state-managed lands, and all other public agency and selected conservation non-profit lands at the request of the Commissioner's Advisory Committee (CAC)—the outside expert advisory group. Initial results indicate that an average of approximately 25% of all native plant communities in each landscape subsection currently have some representation in SNAs. In addition, the project planner has determined the protocol for conducting the evaluation of the latest input data for biodiversity significance and native plant communities (with priority given to state endangered and threatened native plant communities) as a way to prioritize areas for potential SNAs. In addition, rare species and Species of Greatest Conservation Need data will be included where appropriate. The protocol has incorporated the use of Marxan software as the decision-support tool that maps the prioritization of areas based on the input data listed above. The approach, and determination and weighting of inputs have been reviewed and concurrence has been obtained from the CAC members. Trials have been completed for six of the sixteen Minnesota landscape subsections with adequate data coverage. For the two prairie subsections that were run, results show good alignment with the Minnesota Prairie Plan-recommended protection areas. Results also show candidate areas for potential corridor or landscape-scale protection areas that would need partnership approaches and multiple conservation tools to be implemented.

Activity Status as of March 15, 2013:
All accomplishments since July 2011 to date *(changes from December 2012 are underlined)**:***
1a. Acquisition: Acquisition of two parcels at **Forestville-Saxifrage Hollow** (Fillmore County) is underway in cooperation with The Nature Conservancy using LSOHC appropriation(s) and may also include this appropriation.

1b. Baseline Property Reports and Monitoring: ***all accomplishments to date:*** Two contractors are in the process of preparing 22 baseline property reports for easements at twelve SNAs. One baseline is complete; drafts of more than half of the baseline reports have been submitted to the DNR and are under review by staff.

1c. SNA Strategic Plan: The preliminary GAP analysis is completed of Native Plant Communities (NPCs) already protected within by SNAs and those owned by all state-managed lands, and all other public agency and selected conservation non-profit lands at the request of the Commissioner's Advisory Committee (CAC)—the outside expert advisory group. The GAP analysis is being further refined to address the size of NPCs and their relative conservation status. In addition, the preliminary

statewide composite of Marxan results for priority areas for conservation has been completed (for those subsections were biodiversity significance and NPC data is available) and has been reviewed by CAC – this analysis is done by subsection based upon biodiversity significance and NPCs (with priority given to state endangered and threatened native plant communities). Results highlight priority areas for SNA protection and also show candidate areas for potential corridor or landscape-scale protection areas that would need partnership approaches and multiple conservation tools to be implemented. SNA acquisition-designation decision-making processes (and associated tools) are being documented and refined including cost-benefit analysis.

Activity Status as of September 16, 2013:
All accomplishments since July 2011 to date *(changes from March 2013 are underlined)**:***
1a. Acquisition: Acquisition of two parcels at **Forestville-Saxifrage Hollow** (Fillmore County in cooperation with The Nature Conservancy is not going forward this fiscal year; an offer made on a 60-acre parcel was rejected by the landowner, the second landowner is not going forward with a possible sale during this appropriation's timeframe.

WORK PROGRAM AMENDMENT APPROVED by LCCMR September 24, 2013 to add three additional acquisitions to possibly use this funding in order to assure full expenditure of this funding by June 2014:

- The proposed new **Brownsville Bluff SNA** (Houston Co) of up to about 290 acres would protect one of only two authenticated hibernacula (den sites) in Minnesota of the threatened Western Ratsnake; this scenic bluff site overlooking the Mississippi River also contains Southern Dry Mesic Oak-Hickory Woodland (FDs38) and Southern Mesic Oak-Basswood Forest (MHs38) – also proposed for the 2010 ENRTF appropriation; to acquire it fully would require both appropriations..
- The proposed new 890-acre **Badoura Jack Pine SNA** (Hubbard Co) which contains Central Dry Pine Woodland (FDc23 with jack pine overstory and dry prairie understory) has been reduced in western Minnesota from 39 stands 30 years ago, to 10 stands today (and of those 10 only 5 are large enough to harbor a full species compliment for the community). Therefore this community (including the two sub-communities: FDc23a1 and FDc23a2) has been recommended for S1/S2 status by MBS ecologists familiar with the community. The biggest threat to Jack Pine forests is potato farming, and logging, both of which are occurring in this area of the state. The acquisition is primarily being pursued with funding through the Lessard-Sam Outdoor Heritage Council, but current LSOHC appropriations are insufficient to protect this threatened parcel.
- Acquisition of a new 319-acre new **Mille Lacs Moraine SNA** closed in June 2012 (potential partial funding with this appropriation along with 2010 ENRTF and RIM Match). Acquisition of a 241-acre addition to the **Mille Lacs Moraine SNA** has been reinitiated (new appraisal is underway) which may in part be funded through this appropriation.

1b. Baseline Property Reports and Monitoring: ***all accomplishments to date:*** Three contractors have completed their work on 19 of 22 baseline property reports (BPRs) for conservation easements (CEs) at 11 of 12 SNAs. DNR final review is underway, fee landowners will be requested to sign each baseline, and the baseline data needs to be entered into the Department's conservation easement record system. Baselines completed to date are for: Blaine Airport Rich Fen SNA, Burntside Islands SNA, Chamberlain Woods SNA (2 CEs), Felton Prairie SNA – Bicentennial Unit, Lutsen SNA, North Fork Zumbro Woods SNA, Pig's Eye Heron Rookery SNA, Quarry Park SNA (5 CEs), Sugarloaf Point SNA, Wood-Rill SNA (4 CEs), Wykoff-Balsam Fir SNA. Once the St Croix Savanna SNA (3) BPRs are completed, then through this appropriation all SNA conservation easements will have BPRs and the whole backlog of BPRs for SNAs will be addressed.

1c. SNA Strategic Plan: Since the March update, efforts have focused on identifying Opportunity Areas that capture highest priority conservation areas delineated by use of the Marxan decision-support tool. Additional layers reviewed to determine the location of Opportunity Areas include: rare natural features and communities, Ecological Evaluations, existing public lands, and land use/land cover. Data from these layers are being collated for each Opportunity Area. Fact sheets are being prepared

detailing this information, and also conservation challenges and opportunities for each area. Contextual maps showing biological resources and land cover are part of the fact sheet packet for each Opportunity Area. Over the next two months, the Opportunity Areas will be reviewed internally and by the Commissioner's Advisory Committee for ultimate inclusion and prioritization within the Plan. In addition, a SNA Candidate Site Evaluation Guide and Form has been developed and is being tested for rating specific parcels for potential SNA acquisition or designation.

WORK PROGRAM AMENDMENT APPROVED by LCCMR September 24, 2013: To move $21,200 from Activity 1 to Activity 2 - $20K from personnel to personnel and $1.2 K from fleet/travel to fleet/travel – due to less staff time and travel expenses needed for acquisition and the SNA Plan; to move $12,076 from "Other" (MNIT support) to "Professional/technical Contracts" for completion of the whole backlog of SNA conservation easement baseline property reports.

Activity Status as of March 1, 2014:
All accomplishments since July 2011 to date:
1a. Acquisition: Work is progressing on acquisition of an 80-acre parcel for the proposed new **Brownsville Bluff SNA** (Houston Co) that would protect one of only two authenticated hibernacula (den sites) in Minnesota of the threatened Western Ratsnake; this scenic bluff site overlooking the Mississippi River also contains Southern Dry Mesic Oak-Hickory Woodland (FDs38) and Southern Mesic Oak-Basswood Forest (MHs38). This project is likely to be completed with future funding. The other parcel was sold to a private landowner.

The private landowner has accepted the DNR offer to acquire 900 acres to become the proposed new 890-acre **Badoura Jack Pine SNA** (Hubbard Co). This appropriation is expected to pay for about 196 acres of the 560-acre Phase 1 acquisitions; other funding for Phase 1 of the project includes ML10 ENRTF appropriation and the ML11 Outdoor Heritage Fund; Phase 2 is expected to be paid by DNR Forestry's ML13 OHF appropriation and RIM Critical Habitat Match generated by a previous SNA private landowner donation.

Acquisition of a new 319-acre new **Mille Lacs Moraine SNA** closed in June 2012 with other appropriations. The landowner of the 241-acre addition rejected the DNR offer to acquire it.

1b. Baseline Property Reports and Monitoring: ***all accomplishments to date:*** Three contractors have completed their work on 22 baseline property reports (BPRs) for conservation easements (CEs) at 12 SNAs. DNR final review has been completed and meetings are being set up with fee landowners where they will be requested to sign each baseline. Baselines completed to date are for: Anoka Co. Blaine Airport Rich Fen SNA, Burntside Islands SNA, Chamberlain Prairie, Chamberlain Woods SNA, Felton Prairie SNA – Bicentennial Unit, Lutsen SNA, North Fork Zumbro Woods SNA, Pig's Eye Heron Rookery SNA, Quarry Park SNA (5 CEs), St Croix Savanna SNA (3) BPRs, Sugarloaf Point SNA, Wood-Rill SNA (4 CEs), Wykoff-Balsam Fir SNA. These completed CE-BPRs addressed a standing need to document the current conditions on these 22 properties where the SNA program has purchased conservation easements. The signed CE-BPRs and associated baseline data will be entered into the Department of Natural Resources Land Records System.

1c. SNA Strategic Plan: Since the September update, efforts have focused on refining and undertaking ecologist review of the Conservation Opportunity Areas (COA) and their description factsheets and maps.

WORK PLAN AMENDMENT APPROVED April 7, 2014: To move $36,700 from Activity 1 to Activity 2 and $11,800 from Activity 1 back to Activity 3 - this is possible because this appropriation will acquire a portion of 1 large parcel with no boundary survey and less transaction and other costs and because SNA personnel are doing the GIS/database work initially expected to be done by MNIT. **Within Activity 1 to** increase prof-tech contracts due to additional easement baseline contracts, to reduce supplies and zero out printing and "other".

Final Report Summary:

1a. Acquisition: The proposed new 900-acre **Badoura Jack Pine SNA** (Hubbard Co) was acquired in part through this appropriation (190 acres pro-rated for this appropriation). The site contains one of the largest remaining examples of the critically imperiled Central Dry Pine Woodland plant community type with jack pine overstory and an understory of both prairie and northern forest species. A portion of the site was harvested prior to SNA acquisition, yet has an intact ground layer into which jack pine is naturally seeding. This offers opportunities to manage, observe, and research successional processes as the jack pine spread back into the openings. This acquisition was completed in 2 phases, the first in June 2014 and the second in July 2014, it will be designated as an SNA in fall 2014 and its restoration and management plan (including a resource inventory and assessment, goal setting, plant community management recommendations, and an action plan for implementation) will be developed by the end of 2015 using other ENRTF funds appropriated for SNA management plans. No plant community reconstruction is expected to be needed on this property, but future management work will be needed to aide in plant community succession and to control any invasive species using funds as appropriated, such as ENRTF and OHF. Typical estimated costs for management of SNAs was provided to the legislature as part of the DNR's 2010 *Long-Range Budget Analysis of Land Management Needs*.

1b. Baseline Property Reports and Monitoring: Twenty-two baseline property reports (BPRs) were completed for conservation easements (CEs) at 12 SNAs. : Anoka Co. Blaine Airport Rich Fen SNA, Burntside Islands SNA, Chamberlain Prairie, Chamberlain Woods SNA, Felton Prairie SNA – Bicentennial Unit, Lutsen SNA, North Fork Zumbro Woods SNA, Pig's Eye Heron Rookery SNA, Quarry Park SNA (5 CEs), St Croix Savanna SNA (3) BPRs, Sugarloaf Point SNA, Wood-Rill SNA (4 CEs), Wykoff-Balsam Fir SNA. These completed CE-BPRs addressed a standing need to document the current conditions on these 22 properties where the SNA program has purchased conservation easements.

1c. SNA Strategic Plan: The *SNA Strategic Land Protection Plan* has been completed and is available on the SNA website: http://www.dnr.state.mn.us/eco/sna/plan.html. The Plan provides a multi-tiered approach for prioritizing lands to protect through designation as a Scientific & Natural Area (SNA). Secondly it identifies and prioritizes areas for conserving biodiversity and rare natural resources. The Plan contains:

- **Report Narrative** (~70-pages). The report includes: an executive summary; statement purpose and scope of the plan; an overview of SNA basics (purpose, legislative authority and laws, history of program, and summaries of SNA lands, public use and funding); overview of previous SNA plans; description of the components of the state's natural heritage (biodiversity, native plant communities, rare species, etc) and strategies to address climate change; goals, objectives and targets; overview of the plan approach; descriptions of and methodologies to develop key components of the plan (listed below); a summary of related planning efforts (including the *Statewide Conservation and Preservation Plan*); implementation; partners; conclusions; and references.

- **Conservation Prioritization**. At a statewide scale the Marxan decision-support software was used to prioritize the protection of areas that support the greatest range of biodiversity the most efficiently. The data produced a Conservation Prioritization Results map that identified high priority areas for biodiversity conservation. If 10% of these high priority areas become SNAs, the state would be protecting approximately 325,000 acres or 0.6 % of the state. It would also mean designating 136,000 more acres of SNAs over the next 85 years. This might equate to an estimated 300 SNAs by the end of the 21st century. Currently, the Marxan analysis is limited to ecological (Ecological Classification System) subsections for which Minnesota Biological Survey data is complete. Other subsections will be analyzed through other ENRTF appropriations as new data become available.

- **Conservation Opportunity Areas.** At a regional (multi-county) landscape scale, the SNA Strategic Land Protection Plan describes Conservation Opportunity Areas to focus the work of the SNA Program, partners, and others in protecting biodiversity and rare features. These

Opportunity Areas range in size from approximately 1,200 acres to 410,000 acres. Each of 84 Conservation Opportunity Areas are described in a 4-page (or one 2-sided 11x17 sheet) free-standing handout with maps and photographs.

- **Candidate Site Evaluation Guide,** At the small parcel scale, the SNA Strategic Land Protection Plan provides Candidate Site Evaluation Guide to rate each candidate site and to make informed decisions about pursuing potential acquisitions and designations. This Guide has been tested and used on numerous potential sites. It is a useful way of sifting out sites that are not priorities as SNAs.
- **GAP Analysis** (70 pages). This appendix to the Plan identifies which native plant communities in each ecological subsection are protected within existing SNAs and a broader conservation networks (including publicly and privately own preserves), Over 125 of Minnesota's native plant communities have no representation within any SNAs. Only 16% to 41% of Minnesota's native plant communities are protected by SNAs when looking at individual Ecological Classification System subsections.

WORK PLAN AMENDMENT APPROVED September 11, 2014: Moved $4,171 from Activity 1 to Activity 2 - this is possible because of a reduction in the proportion of the fee acquisition paid with this appropriation. **Within Activity 1** decrease contracts by $3011 because costs for baseline reports were less than budgeted; decrease fee title acquisition by $13K total (for reasons noted above with $4171 moved to Result 2 and $8829 moved within Activity 1 as noted here); increase salary by $4103 in order to complete strategic plan because of additional work done to identify and describe conservation opportunity areas; and increase professional services for acquisition because of combined costs for the completed project as well as projects initiated but not completed under this appropriation (one offer was rejected and 2 projects are expected to be completed with ENRTF ML14 appropriation).

ACTIVITY 2: Native Habitat Restoration & Enhancement
Restoration and enhancement activities would be completed on about 1800 acres at ~30 SNAs. Interpretive signs-kiosks would be developed and installed at ~2 SNAs and other development work done at ~6 SNAs. Management plans will be completed for ~6 SNAs (including any sites acquired through these funds). Management practices at ~10 SNAs would be monitored to identify adaptive management process improvements needed to achieve better habitat for rare species and Species of Greatest Conservation Need (SGCN).

Restoration and enhancement activities – including bringing sites acquired up to minimum standards – will be carried out by DNR staff- SNA crews, Conservation Corps Minnesota (CCM), Sentence to Serve (STS), volunteers, and/or contractors. Activities include seed collection, planting, exotics control, woody encroachment removal, site clean-up, signing (including development & installation of interpretive kiosks), fencing, prescribed burns, management plan preparation, and monitoring. All restoration will use seeds/plants of a local ecotype, collected from onsite or within 25 miles. Restoration and enhancement of degraded and rare land features (particularly native prairie, savanna, and forest helps implement the SWAP and achieve Habitat Recommendation 5 of the SCPP. This activity would include all work needed to bring up to the Department's minimum standards those SNA parcels acquired through this funding and will include that restoration and enhancement of newly acquired sites which is ecologically advisable and feasible within the appropriation period.

The Department's "Long-Range Budget Analysis of Land Management Needs" estimates the following statewide needs on SNAs: <u>one time actions</u>: ~1700 acres plant community restoration (reconstruction), ~1600 acres woody encroachment removal, and development work (e.g. cleanup, signs, fencing or parking) at ~30 sites; <u>plus ongoing work:</u> ~2000 acres/year prescribed burns, revisiting about ~ 2000 acres/year to do invasive species spot treatments, revisiting ~20 sites per year to replace/repair signs or fences or do small scale mowing.

Summary Budget Information for Activity 2: ENRTF Budget: $ 673,177

Amount Spent: **$ 673,177**
Balance: **$ 0**

WORK PLAN AMENDMENT APPROVED September 11, 2014 (see below).

Activity Completion Date:

Outcome	Completion Date	Budget
2a. ~18 acres of prairie, forest, etc restoration (reconstruction)	6/30/14	$23,000
2b. ~600 acres of woody removal & exotics species treatment	6/30/14	$129,800
2c. ~1300 acres of prescribed burns	6/30/14	$206,600
2d. development work on ~20 sites	6/30/14	$27,500
2e. management plans completed for ~6 SNAs	6/30/13	$49,800
2f. adaptive management monitoring on ~9 SNA sites	6/30/14	$69,800

Activity Status as of March 1, 2012:
2a. Plant Community Reconstruction & Rehabilitation: Hand seed collection on 9.5 acres was completed for use in the planned ~10 acre native prairie reconstruction project at Zumbro Falls Woods SNA. The 4.2 acre forest reconstruction project at Falls Creek SNA is being done cooperatively with Great River Greening (GRG); GRG planted tree seedlings (using other funding) and the SNA Program installed tree shelters with this appropriation. Two additional native prairie reconstruction projects are being planned with implementation starting in 2012 at Blanket Flower Prairie SNA and Rock Ridge Prairie SNA. **2b. Woody Removal & Invasive Species:** Woody species control activities were completed on 2.3 acres at 2 SNAs; and herbaceous invasive species treatment activities were completed on 0.06 acres at 1 SNA. **2c. Prescribed Burning:** About 0.75 miles of firebreaks were installed at 2 SNAs and burn plans are being prepared for proposed spring 2012 prescribed burns. **2d. Development:** activities completed included: new signs at 4 SNAs, new gates at 2 SNAs, and site clean-up at 1 SNA. **2e. Management Planning:** A federal State Widlife Grant has been approved for $49,8000 which will be matched with this funding in order to have contractors prepare 8-12 management plans with these combined funds. The list of candidate sites for plans has been completed, the RFP is prepared and will go out in March 2012. **2f. Monitoring & AMSD:** Work on this outcome under appropriation is not expected to start until summer 2012.

Activity Status as of December 31, 2012:
All accomplishments to date:
2a. Plant Community Reconstruction & Rehabilitation: Hand seed collection on 9.5 acres at Oronoco Prairie was completed for use in prairie reconstruction project at Zumbro Falls Woods SNA. Seed collection across 34.9 acres has also been initiated at Cottonwood River Prairie to be used in the prairie reconstruction at Rock Ridge SNA. The 4.2 acre forest reconstruction project at Falls Creek SNA is being done cooperatively with Great River Greening (GRG); GRG planted tree seedlings (using other funding) and the SNA Program installed tree shelters with this appropriation. **2b. Woody Removal & Invasive Species:** Woody species control activities were completed on 335.7 acres at 4SNAs; herbaceous invasive species treatment activities were completed on 5.5 acres at 6 SNAs; invasives control boot brush kiosks were installed at 3 SNAs. **2c. Prescribed Burning:** About 13.9 miles of firebreaks were installed at 13 SNAs and prescribed burns were completed on 143.6 acres at two SNAs. **2d. Development:** activities completed included: entry signs at 2 SNAs, boundary signs at 3 SNAs, interpretive signs at 3 SNAs, new gates at 3 SNAs, and site clean-up and fence removal at 1 SNA. **2e. Management Planning:** Three contractors are preparing adaptive management plans for 26 SNAs with a combination of this appropriation, the federal State Wildlife Grant, and some 2010 ENRTF funding. **2f. Monitoring & AMSD:** Work on this outcome under appropriation is not expected to start until spring 2013.

WORK PROGRAM AMENDMENT APPROVED by the LCCMR January 23, 2013: To decrease "Other-training" by $2,102 and add $102 to "Printing" for costs to publish management plan P/T

contract RFP in State Register (as required by state purchasing policies) and to increase "Travel Expense in MN" by $2,000 for fleet charges to operate equipment necessary for restoration, woody removal, prescribed burning, and development work.

Activity Status as of March 15, 2013:
All accomplishments since July 2011 to date:
2a. Plant Community Reconstruction & Rehabilitation: Hand seed collection on 9.5 acres at Oronoco Prairie was completed which has been seeded on 10 acres for a prairie reconstruction project at Zumbro Falls Woods SNA. Seed collection across 34.9 acres has also been initiated at Cottonwood River Prairie to be used in the prairie reconstruction at Rock Ridge SNA. The 4.2 acre forest reconstruction project at Falls Creek SNA is being done cooperatively with Great River Greening (GRG); GRG planted tree seedlings (using other funding) and the SNA Program installed tree shelters with this appropriation. **2b. Woody Removal & Invasive Species:** Woody species control activities were completed on 362.5 acres at 4 SNAs; herbaceous invasive species treatment activities were completed on 5.5 acres at 6 SNAs; invasives control boot brush kiosks were installed at 3 SNAs. **2c. Prescribed Burning:** About 14.4 miles of firebreaks were installed at 13 SNAs and prescribed burns were completed on 143.6 acres at two SNAs. **2d. Development:** activities completed included: entry signs at 2 SNAs, boundary signs at 3 SNAs, interpretive signs at 3 SNAs, new gates at 3 SNAs, and site clean-up and fence removal at 1 SNA. **2e. Management Planning:** Draft adaptive management plans for 26 SNAs are under review by SNA staff that were prepared by contractors with a combination of this appropriation, the federal State Wildlife Grant, and some 2010 ENRTF funding. **2f. Monitoring & AMSD:** Work on this outcome under appropriation is not expected to start until spring 2013.

WORK PROGRAM AMENDMENT APPROVED BY LCCMR March 26, 2013: To decrease "Service contracts" by $15,000 and add $3,000 to "Supplies" for materials necessary for restoration, invasives treatment, prescribed burning, and development work and to increase "Travel Expense in MN" by $12,000 for fleet charges to operate equipment necessary for restoration, woody removal, prescribed burning, and development work.

Activity Status as of September 16, 2013:
All accomplishments since July 2011 to date:
2a. Plant Community Reconstruction & Rehabilitation: Hand seed collection on 9.5 acres at Oronoco Prairie was completed which has been seeded on 5.68 acres (corrected acreage) for a prairie reconstruction project at Zumbro Falls Woods SNA. Seeding (using previously collected seed from on site) was completed on 8.76 acres as part of a rehabilitation of an existing degraded prairie at Oronoco (following tree removal using other funding). Seed collection across 34.9 acres completed at Cottonwood River Prairie and planted through broadcast seeding on 5.66 acres of prairie reconstruction at Rock Ridge SNA. The 4.2 acre forest reconstruction project at Falls Creek SNA is being done cooperatively with Great River Greening (GRG); GRG planted tree seedlings (using other funding) and the SNA Program installed tree shelters with this appropriation. **2b. Woody Removal & Invasive Species:** Woody species control activities were completed on 401.5 acres at 7 SNAs; herbaceous invasive species treatment activities were completed on 218.3 acres at 19 SNAs; invasives control boot brush kiosks were installed at 5 SNAs. **2c. Prescribed Burning:** About 14.7 miles of firebreaks were installed at 13 SNAs and prescribed burns were completed on 370.0 acres at 11 SNAs. Because of weather conditions and other factors significantly limiting burn completion, the target acreage for prescribed burning under this appropriation is being reduced from 1700 acres to about 1300 acres. **2d. Development:** activities completed included: entry signs at 3 SNAs, boundary signs at 3 SNAs, new gates at 5 SNAs, and site clean-up and fence removal/repair at 6 SNA; in total, to date, development-related work has been done on 21 SNAs with this appropriation. In lieu of installing 2 interpretive signs through this appropriation the 5 invasive species boot brush kiosks were installed through this appropriation (see above) and 6 instead of 4 signs were installed through the 2010 ENRTF appropriation. **2e. Management Planning:** Adaptive management plans for 26 SNAs were completed – 1 done by SNA staff (paid completely with this appropriation) and 25 done by 3 contractors with a combination of this appropriation, the federal State Wildlife Grant (SWG), 2010 ENRTF funding and some general fund – as listed below – with significant staff time towards gathering information, directing

contractors, and reviewing/revising these plans all funded through this appropriation. **2f. Monitoring & AMSD:** Native prairie plant community monitoring at targeted SNAs is being done in summer 2013 with this appropriation.

SNA Adaptive Management Plans					
Site Name	**SWG $s**	**ENRTF ML11**	**ENRTF ML10**	**General**	**Total $s**
Butternut Valley				2,672	2,672
Chimney Rock			2,127		2,127
Clinton Falls Dw Trout Lily			2,419		2,419
Eagle's Nest		**1,486**	1,186		2,672
Englund Ecotone		**1,692**	1,120		2,812
Felton Prairie-Bicentennial	3,976				3,976
Felton Prairie-Assinaboia	2,048				2,048
Felton Prairie-Shrike	2,038				2,038
Gustafson's Camp	2,790				2,790
Holthe Prairie	3,425				3,425
Iona's Beach		**2,820**			2,820
Langhei Prairie		**2,124**		527	2,651
Mille Lakes Moraine	3,360				3,360
Morton Outcrops			2,810		2,810
Mound Prairie	2,774				2,774
Mound Spring Prairie	3,325				3,325
Myhr Creek Ridge				2,790	2,790
Pembina Trail-Crookston	2,810				2,810
Pine & Curry Island	2,900				2,900
Prairie Smoke Dunes	4,125				4,125
Spring Creek Prairie	2,511				2,511
St Croix Savanna	2,880				2,880
Twin Lakes			2,677		2,677
Wabu Woods				3,028	3,028
Wolsfeld Woods	1,821				1,821
TOTAL	**40,783**	**8,122**	**12,339**	**9,017**	**70,261**

Note: this is the total project costs; some invoices have not cleared the accounting system and are not in the totals expended.

WORK PROGRAM AMENDMENT APPROVED by LCCMR September 24, 2013 to add Hastings Sand Coulee prairie restoration (reconstruction) project to this funding – to collect on site seed for a restoration project being implemented cooperatively with Friends of the Mississippi River (FMR).

WORK PROGRAM AMENDMENT REQUEST APPROVED by LCCMR September 24, 2013: To move $21,200 from Activity 1 to Activity 2 - $20K from personnel to personnel and $1.2 K from fleet/travel to fleet/travel – **and to move $124,000 from Activity 3 to Activity 2** - $103.8K from personnel to personnel, $16.9K from contracts to fleet/travel, $3.3K from printing to supplies. **Within Activity 2 to move** $30.3K out of P/T contracts, $53.7K out of service contracts into a combination of personnel, tools/supplies fleet/travel, and MNIT (formerly MIS) support staff and materials necessary for invasives treatment, prescribed burning, and development, for fleet charges to operate equipment necessary for woody removal, prescribed burning, and development work, and for ecological monitoring-related database development.

Activity Status as of March 1, 2014:
All accomplishments since July 2011 to date:

2a. Plant Community Reconstruction & Rehabilitation: Hand seed collection on 9.5 acres at Oronoco Prairie was completed which has been seeded on 5.68 acres (corrected acreage) for a prairie reconstruction project at Zumbro Falls Woods SNA. Seeding (using previously collected seed from on site) was completed on 8.76 acres as part of a rehabilitation of an existing degraded prairie at Oronoco (following tree removal using other funding). Seed collection across 34.9 acres completed at Cottonwood River Prairie and planted through broadcast seeding on 5.66 acres of prairie reconstruction at Rock Ridge SNA. The 4.2 acre forest reconstruction project at Falls Creek SNA is being done cooperatively with Great River Greening (GRG); GRG planted tree seedlings (using other funding) and the SNA Program installed tree shelters with this appropriation. Seed was collected (by hand and machine) on 30.5 acres at Hastings Sand Coulee to be used in a prairie restoration to be done on site by Friends of the Mississippi River (FMR). **2b. Woody Removal & Invasive Species:** Woody species control activities were completed on 408.4 acres at 9 SNAs; herbaceous invasive species treatment activities were completed on 274.7 acres at 19 SNAs; invasives control boot brush kiosks were installed at 5 SNAs. **2c. Prescribed Burning:** About 26.4 miles of firebreaks were installed at 16 SNAs and prescribed burns were completed on 436.7 acres at 12 SNAs. Because of weather conditions and other factors significantly limiting burn completion, the target acreage for prescribed burning under this appropriation is being reduced from 1700 acres to about 1300 acres. **2d. Development:** activities completed included: entry signs at 3 SNAs, boundary signs at 5 SNAs, new gates at 7 SNAs, and site clean-up and fence installation/removal/repair at 6 SNA; in total, to date, development-related work has been done on 23 SNAs with this appropriation. In lieu of installing 2 interpretive signs through this appropriation the 5 invasive species boot brush kiosks were installed through this appropriation (see above) and 6 instead of 4 signs were installed through the 2010 ENRTF appropriation.

2e. Management Planning: Adaptive management plans for 26 SNAs were completed – 1 done by SNA staff (paid completely with this appropriation) and 25 done by 3 contractors with a combination of this appropriation, the federal State Wildlife Grant (SWG), 2010 ENRTF funding and some general fund – as listed above – with significant staff time towards gathering information, directing contractors, and reviewing/revising these plans all funded through this appropriation.

2f. Monitoring & AMSD: Native prairie plant community monitoring on 2 SNAs - Langhei Prairie SNA (Pope Co) and Prairie Coteau, SNA (Pipestone Co) - was completed in summer 2013 to provide native prairie long term status trend information for managed sites to inform management decisions – this is being done in conjunction with the Grassland Monitoring Team including the USFWS and The Nature Conservancy. Spring 2014 field work will focus on continuation of work begun with ML10 ENRTF SNA appropriation on surveying bees on targeted SNAs and snake telemetry at Kellogg-Weaver Dunes SNA.

WORK PLAN AMENDMENT APPROVED April 7, 2014: Add up to $1500 for equipment for invasives species herbicide wicking equipment to pull behind a skid loader (see justification below) **and to move $36,700 from Activity 1 to Activity 2** - to personnel. – this to help achieve prescribed burn targets. **Within Activity 2 to move** $s into P/T contracts for snake monitoring-related contracts; move $44..2 out of "other" into a combination of personnel, tools/supplies, and fleet/travel in order to support staff and materials necessary for invasives treatment, prescribed burning, development, and monitoring, for fleet charges to operate equipment necessary for woody removal, prescribed burning, and development work, and for ecological monitoring-related database development; this is possible because MNIT service level agreement for Phase 2 of AMSD has been postponed to future appropriations.

Justification for Purchasing Herbicide Wicking Equipment: Portions of some SNAs, particularly those along the Minnesota River, have become overgrown with brush to the near exclusion of all other species. The SNA Program has cut (and treated) the brush in many of these areas, but thick regrowth will quickly shade out any other vegetation. Consultation with others has determined that the most effective means to control this brush with the least non-target impact would be to wipe the herbicide glyphosate on the brush when and where there is sufficient vertical separation so there should be no

impact to underlying vegetation. Such activities would also likely be occurring predominately early in the growing season while non-woody vegetation is short.

Alternatives considered include repeated mowing, fire, and cut/treat methods:

- Mowing - The areas targeted are generally rocky and mowing and previously have caused significant damage to equipment. Since several years of mowing during the growing season would be required; mowing is essentially cost prohibitive and mowing would also likely prove to be less effective.
- Fire - Fire will still be used as a management tool. However, many of these areas were so dominated by brush that they still will not carry a fire. Frequent fires are also increasingly discouraged due to impacts on fire sensitive species.
- Cut/Treat - Most of these areas experienced a cut and stump treat practice. That practice cleared the larger shrubs, but now the re-sprouting is often several stems per square foot. Wiping of glyphosate on the top of the brushy regrowth once there is sufficient clearance between the regrowth and the non-target vegetation would likely result in much less collateral damage than the cumulative impact of the stump treatment alternative, plus a larger area could be treated with the same effort.

The SNA Program tried a limited pilot last year with a small homemade hand held wick that was wet with a hand sprayer. Efficacy was spotty. It appears that the wick was not kept sufficiently moist. It appears that where we the wick remained wet, excellent control of the brush was achieved with essentially no non-target impact. This year the SNA Program would like to accelerate and improve efforts. The equipment proposed is a fifteen foot wide version of the commercially available product to be pulled behind a skid loader that could be used to control dense regrowth in areas that are vehicle accessible.

Final Report Summary:

2a. Plant Community Reconstruction & Rehabilitation: Native seed was collected on a total of about 75 acres, restoration was completed on 14.4 acres, and substantive restoration establishment work was done on 2 partner projects totaling 15.5 acres. Seed collected on 35.9 acres at Cottonwood River Prairie SNA was mostly used for the Rock Ridge Prairie SNA restoration (described below; but some also broadcast back at Cottonwood River SNA – not considered to be a "restoration" here for reporting purposes). Seed was collected at 9.46 acres at Oronoco Prairie SNA; this seed was originally intended for use in a restoration project initiated but not completed at the Zumbro Falls SNA. Seed collected on 30.3 acres at Hastings Sand Coulee SNA was used in a restoration project done by FMR (not "counted in restoration reported here**).** The 8.76 acre rehabilitation of an existing degraded prairie at Oronoco Prairie SNA (following tree removal using other funding) was completed (see attached Evaluation report). The 5.66 acre prairie reconstruction at Rock Ridge Prairie SNA was completed (see attached Evaluation report). The forest reconstruction projects of 11.3 acres at Franconia Bluffs SNA and 4.2 acres at Falls Creek SNA were done cooperatively with Great River Greening (GRG); GRG planted acorns and tree seedlings (using other funding) and the SNA Program has done the post planting care for projects with this appropriation (see attached Evaluation reports). **2b. Woody Removal & Invasive Species:** Woody species control activities were completed on 610.4 acres at 19 SNAs (including 19 projects done by CCM); herbaceous invasive species treatment activities were completed on 487.2 acres at 33 SNAs (including 8 projects done by CCM); invasives control boot brush kiosks were installed at 6 SNAs (including 1 projects done by CCM). This exceeds the target of 600 acres of invasive species treatment activities. **2c. Prescribed Burning:** About 35.8 miles of firebreaks were installed at 21 SNAs (including 3 projects done by CCM); and prescribed burns were completed on 1,189.5 acres at 25 SNAs (including 12 projects done by CCM);. Because of weather conditions and other factors significantly limiting burn completion, accomplishments fell slightly short of the target of about 1300 acres. **2d. Development:** activities completed included: entry signs at 10 SNAs (including 4 projects done by CCM); boundary signs at 13 SNAs (including 4 projects done by CCM); new gates at 8 SNAs, and site clean-up and fence installation/removal/repair at 7 SNAs (including 3 projects done by CCM); in total, to date, development-related work has been done on 35 SNAs with this

appropriation. In lieu of installing 2 interpretive signs through this appropriation the 6 invasive species boot brush kiosks were installed through this appropriation (see above) and 6 instead of 4 signs were installed through the 2010 ENRTF appropriation.

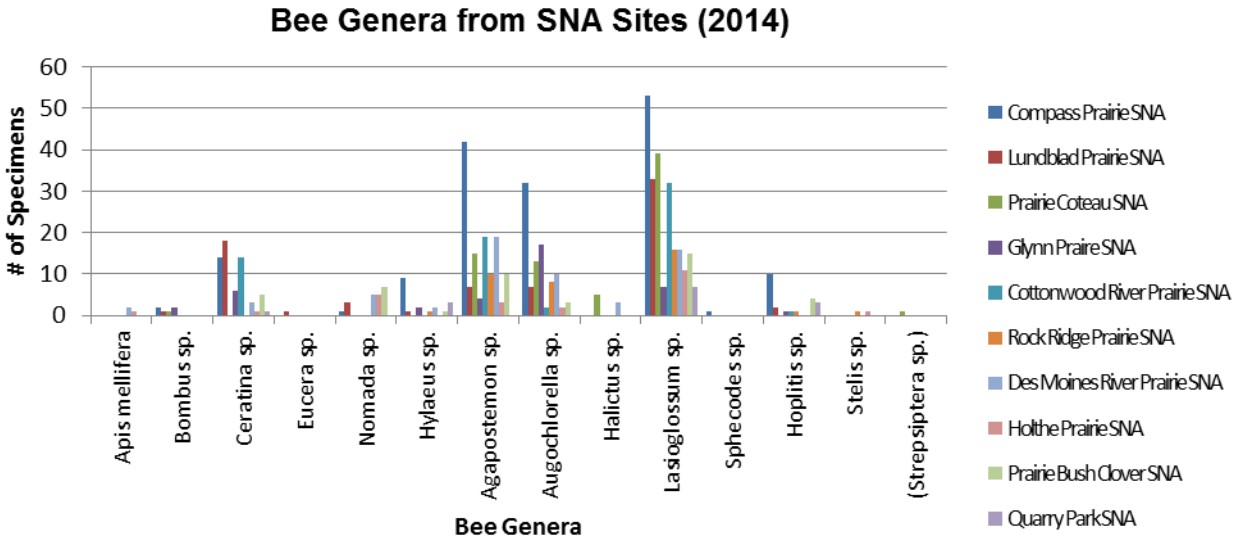
2e. Management Planning: Adaptive management plans for 26 SNAs were completed – 1 done by SNA staff (paid completely with this appropriation) and 25 done by 3 contractors with a combination of this appropriation, the federal State Wildlife Grant (SWG), 2010 ENRTF funding and some general fund – as listed above – with significant staff time towards gathering information, directing contractors, and reviewing/revising these plans all funded through this appropriation.

2f. Monitoring:

A. Pollinator Monitoring.

1) Specimen Processing
    a. ~600 specimens collected in 2014 at 10 SNAs in 8 counties identified to genus.
    b. ~2500 specimens collected in 2013 at 4 SNAs in 3 counties identified and labeled to genus.
2) Results
    a. The genera Lasioglossum, Agapostemon, and Augochlorella were the most abundant on the SNAs. These groups are ground-nesting species. Ceratina was also fairly abundant, and this group nests inside grass stems. Ceratina (the stem-nesters) were not found at Prairie Coteau or Rock Ridge Prairie (Figure 1).
    b. Honey bees were not as abundant on SNAs in southwestern Minnesota visited in 2014 as they were on SNAs near the Twin Cities in late summer 2013. This could be a regional or a phenological difference. For example, collections in 2014 were earlier and may have preceded the return of commercial beekeepers.
    c. Prairie Coteau SNA had one of the lower diversities at the genus level, but was the only site with a specimen of the rarely-captured Strepsiptera. Strepsiptera are parasites that live on bees or other insects.
    d. Prairie Bush Clover SNA had the highest abundance of Nomada, which is a group of bees that invades the nest of other bees. Presence of these nest parasites might indicate that the bee populations at Prairie Bush Clover SNA are abundant enough to sustain the Nomada population.
    e. These preliminary surveys informed the optimal methods for sampling pollinators. Sampling methodology and data results from these surveys will be utilized in the 2014-2015 LCCMR project titled 006-A Wild Bee Surveys in Prairie-Grassland Habitats.

Figure 1



B. Snake Monitoring.

1) Three female Bullsnakes, one male North American Racer, and one female Plains Hog-nosed Snake are being tracked via VHF radio telemetry during the 2014 field season at Kellogg-Weaver Dunes SNA (Wabasha Co) primarily accomplished through this appropriation. Three of the bullsnakes tracked in 2013 did not survive to the summer of 2014. As a result, the North American Racer and Plains Hog-nosed Snake were added in 2014.
2) Results
    a. This study continues to provide valuable information on several snake species considered species in greatest conservation need, including habitat use, nesting sites, and overwintering sites.
    b. Prolonged nontraditional habitat use in marshland habitat was repeated by an individual Bullsnake that utilized this habitat last season.
    c. Important patterns of movement and summer habitat usage are beginning to emerge in Bullsnakes tracked from last season into this season.
    d. A greater number of North American Racers were documented this season compared to last season, and adult Plains Hog-nosed Snakes were documented this season compared to none documented last season.
    e. These results will help inform managers on maintaining habitat for these vulnerable snake species.

C. Native Prairie Monitoring.

1) Native prairie plant community monitoring on 2 SNAs – Langhei Prairie (Pope Co) and Prairie Coteau (Pipestone Co) in summer 2013.
2) Results
    a. Monitoring provided native prairie long term status trend information for managed sites to inform management decisions – this is being done in conjunction with the Grassland Monitoring Team including the USFWS and The Nature Conservancy.

WORK PLAN AMENDMENT APPROVED September 11, 2014:: Removed line for equipment (this turned out to be simpler and less expensive and was purchased as "supplies"), **move $4,771 from Activity 1 to Activity 2** to help achieve prescribed burn targets, **and to move a gross amount of $606 from Activity 3 to Activity 2** (this also includes moving $5,243 of personnel from Activity 3 to Activity 2 and moving $3,392 in supplies and $1073 in travel from Activity 2 to Activity 3) to help achieve prescribed burn targets. **Within Activity 2** decrease professional contracts by $4,400 because pollinator-related adaptive management monitoring was done by DNR staff instead of contracts;

decrease tools/supplies, travel, and "other" budget to what was actually needed to complete work; and increase budget for personnel and CCM contracts in order to achieve prescribed burn targets

ACTIVITY 3: Citizen-Student Engagement in Natural Areas

Description:
A new naturalist-led, local partnership-based initiative will engage residents, students, and other interested people in ecological recreation and education activities on SNAs. This includes recruiting and assisting a network of 80+ SNA volunteer site stewards; co-sponsoring and coordinating 40+ volunteer site restoration and management work days and ecological recreation-educational events (guided nature hikes, birding visits, botanizing, citizen-science activities, etc) aimed at building long-lasting and action-based conservation ethics in the community. New region-based part-time SNA naturalist positions would be established to cultivate and facilitate locally-led citizen-student based activities on SNAs. Work includes: integrating site steward information and volunteer project tracking into the Adaptive Management Spatial Database (AMSD), developing and disseminating a site steward's kit and electronic newsletter, producing and disseminating (primarily through the web) a map of SNAs featuring activities people can do on SNAs, enhancing SNA visitor information on the web, and developing and launching a web-based tool for SNA stewards and visitors to report and share observations (e.g. bird sightings and phenology observations).

Summary Budget Information for Activity 3:

ENRTF Budget:	**$ 287,194**
Amount Spent:	**$ 287,030**
Balance:	**$ 164**

WORK PLAN AMENDMENT APPROVED September 11, 2014 (see below).

Activity Completion Date:

Outcome	Completion Date	Budget
3a. SNA use information & observation reporting tool	6/30/14	$55,800
3b. 40+ volunteer events	12/31/13	$150,000
3c. network of 80+ volunteer site stewards & database tracking	12/31/13	$194,200

Activity Status as of March 1, 2012:
3a. User Information & Reporting Tool. Progress made towards improving information targeted to SNA users on the DNR webpage includes: posting a downloadable (pdf) version of SNA brochure; design of a new format for each SNA's page on the web (in the process of being implemented); development of a new GIS parking layer for all SNAs which will be part of a new interactive SNA site map feature; scanning over 5000 slide transparencies and starting to incorporate many of the images in each SNA's page on the web. A test series of SNA site business card-sized "pocket cards" were distributed throughout the State Fair and subsequently at the DNR Info Center; final designs of the pocket cards and comparable site steward cards (both incorporating a QR code through which a smart phone with camera can directly connect to the SNA web) are being developed. Under development is a e-newsletter and e-communications products for volunteers and site stewards. Also, technologies are being examined to be used for SNA visitors to upload their own SNA wildflower/seasonal photos and other observations.

3b. Events. The SNA volunteer event webpage was redone with increased listings of volunteer opportunities. To date, 16 events have been held with about 300 participants (made possible all or in part with this appropriation). These events included: several nature/bird watching hike/ski outings; a skit presented twice at the Minnesota State Fair; site clean-up or other volunteer work days; and presentations to groups such as 4H, nature photographers, and local naturalists. Plans are underway for many contractor or staff naturalist led events during the growing season and for part-time DNR State Parks naturalists to also have SNA public engagement/site steward recruitment duties.

3c. Site Stewards. A new site steward suite of pages on the DNR SNA website has been created (along with new internal procedures for steward enrollment) and has used to date to enroll three new site stewards. To date, contacts were also made with 21 past site stewards, sites visits conducted with some, and 15 have renewed their involvement. Site steward recruitment has been done through the ENRTF facebook and twitter sites, some of the events (above), and to local environmental learning centers and tribal organizations.

Activity Status as of January 15, 2012:
3a. User Information & Reporting Tool. In addition, to accomplishments listed in the last update, the following has been accomplished. 1) **Statewide Map.** A statewide color map locating all SNAs (with directions to all sites and ENRTF acknowledgement on the back) has been designed, 2500 copies printed, and distribution initiated. The initial proposal to include SNA activity information on the map was changed to locational information instead due to space limits and decision that activity information is kept more up-to-date on the web. 2) **Newsletter.** A quarterly electronic *Nature Notes* newsletter was designed; arrangements made to distribute it to list maintained through govdelivery – with 750 current subscribers (a broader audience than the audience of site stewards initially proposed); 4 issues e-published to date; and emphasis/approach is for each issue to be brief stories with photos and hot links, typically including one site steward observation notes (telling story of site), highlight one SNA site per issue, one feature article per issue e.g. human interest or story they are telling. 3) **Pocket Cards.** A second printing of 7500 "pocket cards" was done and nearly all copies have been distributed. 4) **Website.** the new SNA website is fully operational with interactive maps, updates to each SNA site page (including slide show, interactive locational map, recreation use/visitor notes, and donor recognition) and additions of pages for new SNAs; data from Google analytics has demonstrated that SNA media coverage has led to significant spikes in SNA webpage usage particularly from new visitors; additional upgrades to other pages are in development. 5) **Powerpoints.** Several canned or custom powerpoint presentations have been developed (some with audio, some emphasizing what visitors or volunteers can do at SNAs), presented, and delivered to various audiences for their use and dissemination – this includes Master Naturalists and DNR State Park Naturalists

3b. Events. To date, 114 events have been held with more than 1000 participants (made possible all or in part with this appropriation) – CY11 (July-Dec) 20 events, CY12 27 events, and CY13 to date (July-Dec) 27 events. Most events were promoted on the DNR website and many through local media or partner groups. These events included: many nature/bird watching hike/ski-snowshoe outings; site clean-up or other volunteer work days; and presentations to groups such as 4H, nature photographers, and master naturalists. **SNA Naturalists.** Three SNA-State Parks naturalist positions were created and filled with the SNA portions of their positions paid through this appropriation. Two new seasonal SNA-State Parks naturalists in DNR's northwest region worked from mid-June through November 2012: one based at Lake Bronson State Park assigned to SNAs in Kittson and Roseau Counties and one based at Buffalo River State Park assigned to SNAs in Clay and Norman Counties. A third new SNA-State Parks naturalist in DNR's central region who began in October 2012 is based at Great River Bluffs State Park and is assigned to SNAs in Winona, Houston, and Fillmore Counties. The SNA Naturalists have brought significant professionalism to the development and implementation of SNA site-specific interpretive programs, activities, and materials. Interpretive field trips developed and hosted by naturalists include: a series bringing homeschool groups to various SNAs to study prairie soils, seeds, and animals; a senior boat trip to Pine and Curry Island SNA in Lake of the Woods; and a full moon hike and a couple insect-oriented events which included local college students. Before seasonal layoff, one of the naturalists put together a substantial amount of materials to jumpstart the 2013 season, including a script for a podcast tour featuring 4 SNAs.

3c. Site Stewards. To date, 95 site stewards (i.e. stewards for 95 SNAs) have been secured, including refilling some positions where stewards resigned – this exceeds the proposed target of 80 stewards, with additional volunteers continuing to apply to be new stewards. Procedures for enrolling volunteer site stewards have been refined, including a typical welcome packet of information. Stewards are electronically submitting regular reports on the SNA monitoring visits and some stewards are hosting events and volunteer workdays (included above). A holiday thank you card was personalized

and sent to each steward. A steward recognition event and SNA hike was held on January 12th; this included providing stewards with safety gear, information, etc. In addition, to "regular" duties, one steward is volunteering to update the taxonomy (i.e. naming conventions) for all SNA plant lists.

Activity Status as of March 15, 2013:
3a. User Information & Reporting Tool. *For Result 3a the following accomplishments are additions to those listed in the previous updates* 1) **Statewide Map.** CORRECTION to above: 5000 copies statewide color map locating all SNAs were printed and distribution initiated. 2) **Newsletter.** The 5th issue of the quarterly electronic *Nature Notes* newsletter was just distributed to 1420 current subscribers.
3b. Events *(with changes since December 2012 underlined)***.** To date, about 120 events have been held with more than 1000 participants (made possible all or in part with this appropriation) – CY13 to date (Jan-mid-March) 4 events.
3c. Site Stewards. To date, 95 site stewards (i.e. stewards for 95 SNAs) have been secured, including refilling some positions where stewards resigned – this exceeds the proposed target of 80 stewards, with additional volunteers continuing to apply to be new stewards. Safety vests are being distributed to site stewards.

Activity Status as of September 16, 2013:
3a. User Information & Reporting Tool. *For Result 3a the following accomplishments are additions to those listed in the previous updates* 1) **Pocket Cards.** Twelve new pocket cards where produced for distribution at the State Fair (500 each, 6,000 pieces total). 2) **Newsletter.** The 6th issue of the quarterly electronic *Nature Notes* newsletter was distributed in June to 1,793 current subscribers. 3) **SNA Website.** The "Visiting SNAs" and "How Can You Help" webpages were redesigned and the 1st 16 detailed SNA site maps were added to their site webpages. 4) SNA Site Factsheets. Two-side handouts have been created for 9 SNAs each including a site descriptions and map; these have been distributed at dedications, events and tours. Work under this appropriation is going to focus on if/how a web or social-media-based SNA user observation tool (e.g. spring flowers) would be implemented.

3b. Events. To date, about 170 events have been held with more than 1600 participants (made possible all or in part with this appropriation) – CY13 to date (Jan-Sept) 56 events. Events that stand out are: Introduction to Digital Photography at Mound Prairie, Tour of Management Activities at Gneiss Outcrops, Full Moon Hike at Blanket Flower Prairie, and site steward led hikes at Grey Cloud Dunes (monthly June-October).

3c. Site Stewards. To date, 109 volunteer site stewards (i.e. stewards for 109 SNAs) have been secured, including refilling some positions where stewards resigned – this exceeds the proposed target of 80 stewards, with additional volunteers continuing to apply to be new stewards. In addition to their SNA event duties, the roles of 2 SNA-State Parks Naturalists have expanded their roles this year to include site steward mentoring. The Program is developing standards for PPE and training. Steward highlights include: fence removal at Cherry Grove Blind Valley, assistance with Festival of Birds at Greenwater Lake, invasive buckthorn removal at Clinton Falls Dwarf Trout Lily, and kitten-tails (threatened species) inventory at River Terrace Prairie.

WORK PROGRAM AMENDMENT REQUEST APPROVED by LCCMR September 24, 2013: To move $124,000 from Activity 3 to Activity 2 - $103.8K from personnel to personnel, $16.9K from contracts to fleet/travel, $3.3K from printing to supplies. These changes are possible due achievement of Activity 3 deliverables with less funding than anticipated and with transitioning additional Activity 3 type work from this appropriation to the ENRTF 2013 appropriation. **Within Activity 3 to move** $200 from printing to supplies (note that printing of the SNA map ended up as a "supplies" charge rather than a "printing" charge.)

Activity Status as of March 1, 2014:
3a. User Information & Reporting Tool. *For Result 3a the following accomplishments are additions to those listed in the previous updates* 1) **Newsletter.** The 7th and 8th issues of the quarterly electronic

Nature Notes newsletter were distributed to 2132 subscribers. 2) **SNA Website.** New detailed maps were developed and posted for 10 SNAs. Work under this appropriation helped initiate the SNA Facebook page which was launched using the ML12 ENRTF appropriation. Development of an SNA user observation webtool will not be done through this appropriation.

3b. Events. To date, about 30 events have been held with about 820 participants (made possible all or in part with this appropriation). Events include: a Hill's Thistle Survey at Blanket Flower Prairie SNA, Showshoe and Ski Outing at Sand Lake Peatland SNA, a Peregrine Falcon Program at King and Queen's Bluff SNA.

3c. Site Stewards. To date, 116 volunteer site stewards (i.e. stewards for 109 SNAs) have been secured, including refilling some positions where stewards resigned – this exceeds the proposed target of 80 stewards, with additional volunteers continuing to apply to be new stewards. In addition to their SNA event duties, the roles of 2 SNA-State Parks Naturalists have expanded their roles this year to include site steward mentoring. The Program is developing standards for PPE and training. Steward highlights include: the first ever steward led volunteer project at Helen Allison Savanna SNA and a steward GPS'd the boundaries of Kettle River SNA.

WORK PLAN AMENDMENT APPROVED April 7, 2014: To move $11,800 from Activity 1 back to Activity 3 and within Activity 3 to move $12,000 from "other" to a combination of personnel, contracts, supplies, and printing largely because SNA personnel did the website/web development work initially expected to be done by MNIT. The increase of funding for printing is to contribute towards printing a poster on Northshore SNAs that is being funded in part by federal Coastal Zone Management funds.

Final Report Summary:
3a. User Information/Communications.
1) Electronic Communications. a) **Website.** The nearly new SNA website was developed through this appropriation with interactive maps, updates to each SNA site page (including slide show, interactive locational map, recreation use/visitor notes, and donor recognition) and additions of pages for new SNAs; data from Google analytics has demonstrated that SNA media coverage has led to significant spikes in SNA webpage usage particularly from new visitors. The "Visiting SNAs" and "How Can You Help" webpages were redesigned and the 1st 16 detailed SNA site maps were added to their site webpages. Part of the upgrades were made possible by scanning over 5000 slide transparencies from a professional photographer and contracting to have additional photographs of taken of SNA . The website also includes a downloadable (pdf) version of SNA brochure. b) **Newsletter.** A quarterly electronic *Nature Notes* newsletter was designed; 8 issues were developed through this appropriation and distributed through govdelivery – with 2612 current subscribers. c) **Powerpoints.** Several canned or custom powerpoint presentations have been developed (some with audio, some emphasizing what visitors or volunteers can do at SNAs), presented, and delivered to various audiences for their use and dissemination – this includes Master Naturalists and DNR State Park Naturalists.

2) Print Communications. a) **Statewide Map.** A statewide color map locating all SNAs (with directions to all sites and ENRTF acknowledgement on the back) was designed, 5000 copies printed, and distributed (leading to an update and reprinting in July 2014 with ML13 appropriation). b) **Pocket Cards.** These business card-size cards each featuring 1 SNA (and incorporating a QR code through which a smart phone with camera can directly connect to the SNA web) have been printed and almost all distributed through the State Fair, DNR Info Center, and many DNR events: 1st printing 12 SNAs (~100 each, ~1200 pieces total); 2nd printing of 12 SNAs (~625 each, 7500 pieces total); and 3rd printing highlighting 8 North Shore SNAs (500 each, 4,000 pieces total). c) **SNA Site Factsheets**. Two-side handouts have been created for more than 9 SNAs each including a site descriptions and map; these have been distributed at dedications, events and tours. d) **North Shore Guide**. A color poster-booklet on "The Ten Best Places of the North Shore: A Visitor's Guide to North Shore Scientific and Natural Areas" was printed and distributed through a combination of this appropriation and federal Coastal Zone Management funding.

3b. Events. About 188 SNA educational and stewardship events were held with 2745 participants (made possible all or in part with this appropriation). Events include: Hill's Thistle Survey at Blanket Flower Prairie SNA, Showshoe and Ski Outing at Sand Lake Peatland SNA, a Peregrine Falcon Program at King and Queen's Bluff SNA. Events have been done through joint SNA- State Parks naturalists, SNA staff, contractors, Master Naturalists and other volunteers.

3c. Site Stewards. Through this appropriation, a network of 124 volunteer site stewards (i.e. stewards for 124 SNAs or 78% of SNAs) have been secured, including refilling some positions where stewards resigned – this exceeds the proposed target of 80 stewards, with additional volunteers continuing to apply to be new stewards. The Program developed standards for safety equipment-supplies (including personal protective equipment) and training. Also,a one-day training was provided for for stewards on a variety of topics including rare species, native plant communities, and invasives. Steward highlights include: conducted survey for Louisiana waterthrush at Kettle River, removal of invasive garlic mustard at Pine Bend Bluffs, trail inspection to note needed repairs at Wolsfeld Woods SNA, observing osprey regularly on Whitney Island, the first ever steward led volunteer project at Helen Allison Savanna SNA, and GPS'ing the boundaries of Kettle River SNA.

WORK PLAN AMENDMENT APPROVED September 11, 2014: Moved a gross amount of $606 from Activity 3 to Activity 2 (this also includes moving $5,243 of personnel from Activity 3 to Activity 2 and moving $3,392 in supplies and $1073 in travel from Activity 2 to Activity 3) to help achieve outreach activities **and within Activity** 3 (in conjunction with switches with Activity 2 $s) decrease personnel and "other"; increase printing because of higher costs for the Northshore poster; increase supplies for safety supplies for site stewards; and increase travel for outreach activities.

V. DISSEMINATION:

Description: Dissemination will primarily be achieved through the SNA webpage on the DNR website: http://www.dnr.state.mn.us/snas/index.html . All volunteer events will be listed at the webpage and SNA visitors and site stewards will be able to report and share observations (e.g. bird sightings and phenology observations) via a new web-based tool. The updated SNA Long Range Plan and new SNA map (featuring activities people can do at SNAs) will be posted on the webpage. A limited number of printed copies of the plan will be available upon request through the webpage and DNR Information Center. The new map will be distributed through the DNR Information Center, at DNR region and area offices and state parks, at the State Fair, and through SNA event co-sponsors – with primary emphasis on facilities/organizations that are near SNAs and are cooperating on sponsoring SNA events. The SNA naturalists are expected to make presentations and lead field trips at SNAs and/or to promote involvement in SNAs. The site steward kits and e-newsletter will be disseminated to officially recognized site stewards.

Status as of March 1, 2012: Public information and involvement events are discussed above. Site steward information, enrollment, and steward kit information is available at http://www.dnr.state.mn.us/sna/stewards/index.html and to date has been promoted on the ENRTF facebook and twitter. A newly updated volunteer page, with the addition of a volunteer events calendar can be found at http://www.dnr.state.mn.us/volunteering/sna/index.html. The DNR informational brochure is downloadable at: http://files.dnr.state.mn.us/eco/sna/brochure_sna.pdf.

Status as of January 15, 2012: Public information and involvement events are discussed above and web-links continue as in March 2012 update. A statewide color map locating all SNAs (with directions to all sites and ENRTF acknowledgement on the back) has been designed, 2500 copies printed, and distribution initiated. Four issues of the quarterly electronic *Nature Notes* newsletter were emailed through govdelivery – with 750 current subscribers (see further description above). Naturalist-led events are being held (as discussed above) and being publicized locally such as through posters and

notices at State Parks, a homeschool webpage, via Moorhead Community Education, local newspaper and radio, DNR website (both statewide event list and state park pages).

Status as of March 15, 2013: See comments above including the 5th issue of *Nature Notes* and correction that 5000 copies of the statewide color map were printed and being distributed.

Status as of September 16, 2013: See comments above including the 6th issue of *Nature Notes* and distribution of new pocket cards and SNA pocket cards.

Status as of March 1, 2014): See comments above including the 7th & 8th issue of *Nature Notes.*

Final Report Summary: Dissemination is primarily achieved through the upgraded SNA webpage on the DNR website: http://www.mndnr.gov/snas. The SNA Strategic Land Protection Plan is also disseminated through this website: http://www.dnr.state.mn.us/eco/sna/plan.html. All volunteer events are listed at the webpage. Volunteer site stewards submit periodic reports via a generic SNA email address sna.dnr@state.mn.us created through this appropriation for a broad variety of constituent communications. Through this appropriation, the quarterly electronic Nature Notes newsletter was initiated and 8 of 10 issues were emailed through govdelivery– with over 2600 current subscribers.

A statewide color map locating all SNAs (with directions to all sites and ENRTF acknowledgement on the back) has been designed, 5000 copies printed, and nearly all copies distributed (reprinted in July 2014 with ML13 appropriation) through the DNR Information Center, at DNR region and area offices and state parks, at the State Fair, and through SNA event co-sponsors – with primary emphasis on facilities/organizations that are near SNAs and are cooperating on sponsoring SNA events. A color poster-booklet on "The Ten Best Places of the North Shore: A Visitor's Guide to North Shore Scientific and Natural Areas" was printed and distributed through a combination of this appropriation and federal Coastal Zone Management funding. Each year series of new business card-size "pocket cards" each featuring 1 SNA (and incorporating a QR code through which a smart phone with camera can directly connect to the SNA web) have been printed and almost all cards for the 32 SNAs produced to date have been distributed through the State Fair, DNR Info Center, and many DNR events.

VI. PROJECT BUDGET SUMMARY:

A. ENRTF Budget:

Budget Category	$ Amount	Explanation
Personnel:	$827,761	Mgmt. Coord.(~0.3 FTE classified); IT-web staff (~1.1 FTE classified & unclassified); Spec's & Tech's & Planner (~3 FTE classified & unclassified); Laborers (classified) & Seasonal Crews & Naturalists (unclassified (~2 FTE)
Professional/Technical Contracts:	$81,525	Activity 1b: SNA easement baseline property reports & monitoring (~$18K); Activity 2e: SNA adaptive management plans (~$19K); Activity 2f: adaptive management monitoring (~$27K); and Activity 3 volunteer/student events/projects (~$50K)
Service Contracts	$131,646	Activity 2 deliverables including 2a native habitat reconstruction (~$10K), 2b woody encroachment removal & exotics control (~$80K), 2c prescribed burning (~$100K); and 2d site development (fences, signs, etc) (~$8K)
Tools/Supplies:	$42,898	Activity 1: field work & work session supplies; Activity 2: 2a-2c parts, tools, repair costs & supplies

		for restoration, enhancement, management plans, & monitoring; 2d interpretive displays, signs & posts, fencing, etc Activity 2f: field supplies Activity 3: volunteer and school events supplies (including safety items, handtools, etc)
Fee Title Acquisition:	$437,000	DNR – SNA
Professional Services for Acq:	$29,099	
Printing:	$3,629	
Travel Expenses in MN & Fleet Charges:	$79,350	mileage, lodging & meals as per state contracts) & fleet charges for trucks, cars, & equipment, e.g. mowers, seeders (Note: travel & fleet are now combined because they are in SWIFT.)
Other:	$3,166	database & web development & support (MIS); training; postage
TOTAL ENRTF BUDGET:	**$1,640,000**	

Explanation of Use of Classified Staff: Consistent with approved work plans for previous ENRTF appropriations for the SNA program, this funding will be used to pay project-associated costs for classified & unclassified staff paid almost exclusively with special project funds. The classified Management Coordinator (whose position was created about 18 months ago to be paid with special project funds) will be responsible for providing technical guidance statewide to assure adherence with program standards, and for developing and administering contracts statewide, following the state bid process and procedures (e.g. management plan contracts, etc.). The Specialist and Technician level positions (classified and unclassified) work with landowners and real estate staff to complete acquisition projects and baseline property reports; design, coordinate and oversee restoration and enhancement projects – including ones involving volunteers and site stewards; and recruit, train, and coordinate with site stewards and volunteers. In addition, a combination of SNA and MCBS specialist-level positions (both classified and unclassified) and 1 unclassified planner will provide scientific/field expertise, analysis, etc. for the long range plan-strategic prioritization. Laborers (classified) and other seasonal crews (unclassified) will be used to implement management activities, such as prescribed burning or invasive species treatments. In addition, portions of 2-3 IT positions will involved in this project: 1-2 classified special project staff doing database development and GIS; and 1 unclassified position doing web development and other duties related to citizen-student-volunteer engagement. These positions would not exist, but for special project funding received through the ENRTF and other funds. Each year these positions are assigned work based on the particular combination of soft funding available to address priority SNA Program activities. No funding from this appropriation will be used to cover personnel costs for this work program's Project Manager.

Explanation of Capital Expenditures Greater Than $3,500: NA

Number of Full-time Equivalent (FTE) funded with this ENRTF appropriation: approximately 6.15 FTE spread across approximately 20-30 positions.

B. Other Funds:

Source of Funds	$ Amount Proposed	$ Amount Spent	Use of Other Funds
State:			
General Fund and other funds as appropriate	$125,600	$23,270	Shared Services (operations support governance) are services that DNR relies on in order to conduct business and support the work of the department. These services are more efficient when shared.

General Fund	$98,400	$0	Division Support Costs that help maintain basic program operations
TOTAL OTHER FUNDS:	**$224,000**	**$23,270**	

Note: the Department Shared Services costs are fully stated above and are less than proposed; the Division support costs for ENRTF projects were distributed proportionately across all Division funding sources from which those costs can be paid – no specific value for costs for this project were calculated.

VII. PROJECT STRATEGY:

A. Project Partners: Work under this proposal is coordinated with separately funded work of partners including work with Metro Conservation Corridors and Habitat Corridors partners (such as Friends of the Mississippi River for restoration & enhancement), Trust for Public Land (acquisition, including LaSalle Lake Phase 2), and Minnesota River Green Corridors Initiative (acquisition). These efforts are complementary not redundant; all accomplishments on joint projects would be prorated.

B. Project Impact and Long-term Strategy:
This project will help protect and perpetuate rare species, SGCNs, and natural features of state significance across the state, selected because of their importance and strategic value. As a part of the State Outdoor Recreation system, SNAs are open to the public for hiking, nature photography, bird watching, snowshoeing, and other activities that do not disturb the natural conditions. Some SNAs are open to all legal hunting, while others are open only to specific types of hunting to help achieve management goals. SNAs are intended to give people the opportunity to experience undisturbed nature without public convenience facilities.

The goal of the Scientific and Natural Areas (SNA) program is to preserve the ecological diversity of Minnesota's natural heritage, requiring the protection and management of all features in sufficient quantity and distribution across the state. Protecting multiple sites in each landscape area is critical to capturing the full range of genetic diversity and preventing the loss of important species, communities, and features in the state.

The SNA Long-Range Plan, which was developed with the Commissioner's Advisory Committee, recommends the protection of 500 sites through SNA designation by 2085, including: 200 prairie SNAs, 135 deciduous forest SNAs, and 165 coniferous forest SNAs. The plan further recommends that five examples of each native plant community and three examples of each rare feature need to be protected as SNAs in each landscape (or subsection) of the state in which they naturally occur.

The SNA program targets acquisition and designation of Minnesota County Biological Survey (MCBS) mapped sites of outstanding and high biodiversity significance. If the program were to target, in the next 10 years, acquisition and protection of one percent of the already mapped unprotected outstanding and high biodiversity significance acres in all ecological sections (excluding the section containing the large peatland SNAs), the resulting total would be a SNA acquisition target of approximately 19,800 in the next 10 years. This 10-year total would equal an average of 1,980 acres acquisition and designation per year which compares to the FY06-10 average of 500 acres acquired per year.

The numerous types of rare resources and native habitats for which the Scientific and Natural Areas are acquired demand a broad and adaptive array of techniques to protect them. Sites acquired as SNA must be in a predominantly high quality natural state. However, peripheral disturbed areas are often part of an acquisition and threats to the integrity of native plant community remnants, such as invasive species or human disturbance, continue to increase. In general, because of scale of remaining natural habitat and the lack of natural disturbance, SNAs which are native prairie and savannas require the

greatest level of management, while the peatland SNAs require the least, and forested SNAs fall in the middle and vary among themselves depending on their location and size.

All SNA acres are intended to be managed as existing or restored native plant communities. This includes reconstruction of native plant communities on sites previously converted to other uses and it may include rehabilitation of degraded sites through interseeding. Specifically, existing SNAs (as of July 1, 2010) have a total of about 1,700 acres statewide that need native plant community reconstruction with seed of local ecotype. All fire dependent plant communities in SNAs should be managed through prescribed burning. Specifically, excluding the peatlands, an estimated 20% of SNAs have prairie-grassland-wetland communities and an estimated 5-10% have forest or brushland communities that need to managed through prescribed fire; no more than 20-25% of a given site (or site complex) should be burned annually. On all SNAs impacted, control measures are to be implemented to reduce impacts from species that are harming a native plant community or other native feature. Plant management treatments target herbaceous and woody invasive species that displace native plant communities.

C. Spending History:

Funding Source *Note: this list is of appropriations by approp. yr. NOT expenditures (except ** which are all acquisition project landowner payments or donated land value)*	**M.L. 2005-06 or FY 2006-07** (two years)	**M.L. 2007 or FY 2008**	**M.L. 2008 or FY 2009**	**M.L. 2009 or FY 2010**	**M.L. 2010 or FY 2011** (may not be complete)
ENRTF	$66,500 (5a) $300,000 (5b) $134,000 (5c)	$50,000 (4b) $243,000 (4c)	$37,500 (3c) $515,000 (3a) $1,000,000 (3f) $140,000 (3m)	$37,500 (4e) $410,000 (4f) $703,300 (4d)	$31,500 (4f) $1,046,700 (4b)
OHC					$1,408,000
G.O. Bonds	$2,300,000		$3,000,000		
** Lakeshore Lease Fund	$179,300				$17,800
** RIM plate match	$1,268,400			$7,000	$637,000
** Other state	$161,000				$7,000
Federal – State Wildlife Grant				$251,300	
** Federal – LAWCON	$759,500				
** Federal – Coastal Zone	$478,000				
** Dakota Co – FNAP	$566,000			$80,000	$100,000
** Partners (TPL)		$430K			$2,052,000
** Partners (FMR)					$50,000
** Mitigation - $s fr other landowner				$150,000	
** Landowner donations (not complete information)				>$40,000	>$490,000

VIII. ACQUISITION/RESTORATION LIST: See Acquisition/Restoration List.

IX. MAP(S): See Figure 1 map attachment.

X. RESEARCH ADDENDUM: NA

XI. REPORTING REQUIREMENTS:

Periodic work plan status update reports will be submitted not later than March 1 and September 1 of each year starting in 2012. A final report and associated products will be submitted by August 1, 2014 as requested by the LCCMR.

Final Attachment A: Budget Detail for M.L. 2011 (FY 2012-13) Environment and Natural Resources Trust Fund Projects **FINAL REPORT Sept 5, 3014; updated Oct 15, 2014**

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget	Amount Spent	Balance	Activity 2 Budget	Amount Spent	Balance	Activity 3 Budget	Amount Spent	Balance	TOTAL BUDGET	TOTAL SPENT	TOTAL BALANCE
	Approved September 11, 2014			Approved September 11, 2014			Approved September 11, 2014			Approved September 11, 2014		
BUDGET ITEM	**Protection of Sites of Biodiversity Sign.**			**Native Habitat Restoration & Enhancem't**			**Citizen-Student Engagement in SNAs**					
OVERALL Personnel (Wages and Benefits)	$ 181,793	$ 181,793	$ -	$ 421,623	$ 421,623	$ -	$ 224,345	$ 224,345	$ 0	$ 827,761	$ 827,761	$ 0
Management Coordinator (classified contract & proj. mgmt) (~0.3 FTE; ~20% fringe; part for 1 year & part for 2 yrs) (~$56.7K)												
IT database staff (~0.1 FTE; ~20% fringe; 1 year); unclassified IT web development staff & naturalist coordinator (~. 1.0 FTE; ~2 year) (~$101K)												
Specialists & Technicians & Planner (~3 FTE classified & unclassified spread across ~ 20 people; ~20% fringe; part for 1 year & part for 2 yrs) (~$511.8k)												
Laborers (classified) & unclassified Seasonal Crews & Seasonal Naturalists (~2 FTE spread across ~ 8 people; ~15% fringe; part of 1 year & part for 2 yrs) (~$86.6K)												
Contracts: Professional/technical Contractors (state bid process) for deliverables including: **Activity 1b:** SNA easement baseline property reports & monitoring (~$18K); **Activity 2e:** SNA adaptive management plans (~$19K); **Activity 2f:** adaptive management monitoring (~$27K); and **Activity 3** volunteer/student events/projects & services (~$50K)	$ 28,206	$ 28,206	$ -	$ 17,201	$ 17,201	$ -	$ 36,118	$ 36,118	$ -	$ 81,525	$ 81,525	$ -
Service contracts: (CCM or state bid process) for Activity 2 deliverables including 2a native habitat reconstruction (~$10K), 2b woody encroachment removal & exotics control (~$80K), 2c prescribed burning (~$100K); and 2d site development (fences, signs, etc) (~$8K)			$ -	$ 133,646	$ 133,646	$ -			$ -	$ 133,646	$ 133,646	$ -
Tools/Supplies: **Activity 1**: field work & work session supplies; **Activity 2: 2a-2c** parts, tools, repair costs & supplies for restoration, enhancement, management plans, & monitoring; **2d** interpretive displays, signs & posts, fencing, etc **Activity 2f**: field supplies **Activity 3:** volunteer and school events supplies (including safety items, handtools, etc)	$ 133	$ 65	$ 68	$ 30,088	$ 30,088	$ -	$ 11,592	$ 11,592	$ -	$ 41,813	$ 41,745	$ 68
Fee Title Acquisition	$ 440,011	$ 437,000	$ 3,011			$ -			$ -	$ 440,011	$ 437,000	$ 3,011
Professional Services for Acquisition	$ 29,099	$ 29,099	$ -			$ -			$ -	$ 29,099	$ 29,099	$ -
Printing	$ 61	$ 61	$ -	$ 102	$ 102	$ -	$ 3,466	$ 3,466	$ -	$ 3,629	$ 3,629	$ -
Travel expenses in Minnesota (mileage, lodging & meals as per state contracts) & **Fleet charges** for trucks, cars, & equipment, e.g. mowers, seeders	$ 326	$ 326	$ -	$ 70,351	$ 70,351	$ -	$ 8,673	$ 8,673	$ -	$ 79,350	$ 79,350	$ -
Other: training (<$100), postage (<$300), database, website, & observation webtool development & support (MIS)	$ -		$ -	$ 166	$ 166	$ -	$ 3,000	$ 2,836	$ 164	$ 3,166	$ 3,002	$ 164
COLUMN TOTAL	**$ 679,629**	**$ 676,550**	**$ 3,079**	**$ 673,177**	**$ 673,177**	**$ -**	**$ 287,194**	**$ 287,030**	**$ 164**	**$ 1,640,000**	**$ 1,636,757**	**$ 3,243**

Environment and Natural Resources Trust Fund
M.L. 2011 Acquisition/Restoration List **March 2014 update**

Project Title: Scientific and Natural Area Acquisition and Restoration
Project Manager Name: Margaret (Peggy) Booth
M.L. 2011 ENRTF Appropriation: $ 1,640,000

#	Acquisition or Restoration Parcel Name	Geographical Coordinates Latitude or UTM-X	Longitude or UTM-Y	Ecosystem Description	Ecological Significance	Activity Description	# of Acres	# of Shoreline Miles (if applicable)	Proposed Fee Title or Easement	Status
~~1~~	~~Art Lake Hardwood Ridges~~	~~634607~~	~~5263231~~	~~forest~~	~~part of 4700 acre MCBS-mapped ecologically intact area with oldgrowth sugar maple and upland white cedar forest on remote ridges; black~~	~~Fee title acquisition~~	~~240~~	~~none~~	~~DNR SNA~~	~~after initiating project, alternative protection strategies being pursued with county~~
2	Forever Wild	434298	5240457	forest	lakeshore property with diverse aquatic vegetation and fish habitat on Siseebakwet (Sugar) Lake; remainder of hardwood knob in existing SNA; habitat for forest birds.	Fee title acquisition	3	.91 miles	DNR SNA	offer on 13-acre private parcel rejected by owner.
3	Englund Ecotone	410739	5060868	forest-wetland-savanna complex	Pin Oak-Bur Oak Woodland, Sedge Meadow, and Dry Barrens Oak Savanna and 4 rare plants species	Fee title acquisition	350	none	DNR SNA	offer on 367-acre private parcel rejected by owner; 2nd parcel sold to other party.
~~4~~	~~Savage Fen - Phase 2~~	~~471988~~	~~4957651~~	~~forest-wetland-fen~~	~~calcareous fen-wetland complex, forested bluff; Phase 2 is ~ 98 acre acquisition from developer who will option it to TPL; this is also proposed as a TPL Metro Corridors project.~~	~~Fee title acquisition~~	~~98~~	~~none~~	~~DNR SNA~~	~~This project is on hold & no longer being considered for this approp.~~
~~5~~	~~Magney-Snively~~	~~558322~~	~~5171254~~	~~forest~~	~~MCBS-mapped outstanding & high biodiversity signficance northern hardwood forest with rare features~~	~~Conservation easement acquisition~~	~~1800~~	~~none~~	~~DNR SNA~~	~~federal grant not received; project on hold~~
~~6~~	~~Cold Spring Heron Rookery~~	~~391663~~	~~5035495~~	~~floodplain forest~~	~~frontage on Sauk River; floodplain forest~~	~~Fee title acquisition~~	~~40~~	~~.41 miles~~	~~DNR SNA~~	~~project put on hold; funding directed to other projects on this list~~
7	Forestville-Saxifrage Hollow	558301	4830260	forest	algific talus slope, hardwood forest	Fee title acquisition	100	1.14 miles	DNR SNA	offer on 60-acre parcel rejected by owner; 2nd landowner not ready to proceed & will not be pursued under this approp.
~~8~~	~~Blanket Flower Prairie~~	~~254829~~	~~5175314~~	~~prairie~~	~~dry sand-gravel prairie, 3 rare plants, 1 rare butterfly~~	~~Reconstruction~~	~~14~~	~~none~~	~~DNR SNA~~	project will not be done under this appropriation
9	Zumbro Falls Woods	547617	4900507	prairie	dry & mesic oak forest, dry prairie, dry cliff communities, 3 rare plants	Reconstruction	0	NA	DNR SNA	project iniitated, but not completed with this approp
10	Oronoco Prairie	540517	4887408	prairie	dry prairie, 6 rare plants	Rehabilitation	9	none	DNR SNA	interseeding of native prairie seed from onsite has been completed on prairie knobs where woody removal was completed
11	Falls Creek	517806	5013729	forest	white pine hardwood forest, 2 rare plants	Reconstruction	4	none	DNR SNA	tree shelters were installed & invasives control performed around trees planted by GRG.
12	Franconia Bluffs	523462	5024081	forest	oak forest, 5 state-listed nesting birds	Reconstruction	11	none	DNR SNA	treeblankets & shelters were installed & invasives control performed around trees planted by GRG.
13	Rock Ridge Prairie	334342	4884630	prairie	dry bedrock prairie, 1 rare plant	Reconstruction	6	none	DNR SNA	project completed with this appropriation
14	Badoura Jack Pine	370851	5191777	forest & prairie	jack pine forest & prairie	Fee title acquisition	900	none	DNR SNA	acquired in part with this appropriation
15	Brownsville Bluff	638475	4836433	forest	Mississippi River bluffs with oak forest supporting rare snake.	Fee title acquisition	300	none	DNR SNA	acquisitions of 2 parcels iniitiated; to be completed with ML14 funding.
16	Mille Lacs Moraine	432904	5125115	forest	mesic hardwood forest & lakeshore	Fee title acquisition	240	1.72 miles	DNR SNA	landowner rejected offer.
17	Hastings Sand Coulee	513751	4951051	prairie	Dry hill prairie	Reconstruction	8	none	DNR SNA	seed collected on site for project implemented by FMR

NOTES:

SNA CANDIDATE SITE EVALUATION GUIDE

For internal planning process, to determine whether to buy a particular ownership

Maximum score: 100 pts.

Criteria for each point award are met by meeting just one threshold, e.g. all of the three criteria for Occurrence of suitable habitat do not need to be met to obtain the 15-point award for that Evaluation Factor.

Initial Criteria: (all 3 should be answered with "yes" before proceeding)	**Yes**	**No**	**In process**	
Has the parcel received an Ecological Evaluation recommending site as SNA?	☐	☐	☐	Date EE completed_____ Is a new EE needed? _____
Is public access available to the site? (side borders a public road, or legal access to the site accompanies the deed)	☐	☐	☐	
Is the landowner willing to consider selling?	☐	☐		

*Note: Parcels nominated solely for their geological features are not evaluated with this form

	Points awarded for meeting criteria:					
Evaluation factors:	**20-16 points**	**15-11 points**	**10-6 points**	**5-4 points**	**3-1 points**	**0 points**
Diversity and quality of the native habitat contained in the parcel (based on DNR Natural Heritage Database, MN Biological Survey or MBS or Regional Ecologist update) (20 pt. maximum)	• More than half of the site acres consist of a natural community with an A, B, AB, or BC element occurrence (EO) ranking. • All of the parcel is identified as MBS site of Outstanding Biodiversity Significance.	• About half of the site acres consist of C-ranked community, and the rest is ranked higher than C (EO) ranking. • Part of parcel identified as MBS site of Outstanding Biodiversity Significance • Parcel or part of parcel identified as MBS site of High Biodiversity Significance. • The parcel includes one or more "lakes of biodiversity significance" as identified by MBS	• About half of the parcel acres are composed of C-ranked native plant communities, the rest is D-ranked or lower. • All of parcel identified as Moderate Biodiversity significance or higher	• About half of the parcel acres are composed of C-ranked native plant communities, the rest is D-ranked or lower. • Part of parcel identified as Moderate Biodiversity Significance, the rest of parcel lower than "moderate".	• Less than 50% of the parcel is C-ranked native communities, and rest is ranked lower than C	• The only native community present on parcel has a D ranking • All of site is ranked "below threshold" for biodiversity significance
Occurrence of, or suitable habitat for rare species within the parcel OR Occurrence of NPCs missing from SNA program objective (20 pt. maximum)	• Presence of a federally listed species; and/or presence of one or more state endangered or threatened species occurrences (these state E or T species must have A, B or B/C ranking). • Presence of a native plant community that is not already protected by an SNA in the ecological subsection, as identified by the gap analysis.	• Presence of *habitat* for a federally listed species that it would reasonably be expected to use (big enough for its territory, enough food for it, neighboring lands harbor it). • An unranked occurrence of a state endangered or threatened species. • Site includes a "key habitat" as determined by Tomorrow's Habitat for the Wild and Rare: Minnesota's Comprehensive Wildlife Conservation Strategy • Helps to meet the SNA objective of 5 NPCs per ecological subsection – as identified in the gap analysis.	• Presence of one or more special concern species with any ranking (A through none).	• Presence of one or more listed or special concern species (with any ranking) on nearby properties. • 5 or more Species of Greatest Conservation Need (SGCN) for the subsection where the parcel is located, as determined by Tomorrow's Habitat for the Wild and Rare: Minnesota's Comprehensive Wildlife Conservation Strategy		• No rare species seen on parcel or within 2 miles • The SNAs in the subsection where the parcel is located already protect 3 examples of each species and 5 examples of each NPC found on this parcel.
Size of parcel (15 pt. maximum)		• NPC is significant in size for this NPC type, and in this ECS subsection. • While each NPC is of moderate size for the NPC type, the ownership parcel is large for the area.	• Moderately-sized remnant relative to other comparable communities in the ECS subsection.			• Small community remnant relative to other examples in the area.
Location of the parcel in relation to other biodiversity hot spots and/or conservation land (15 pt. maximum)		• Parcel is in a high priority (red or orange) area of the Marxan prioritization mapping; and/or is projected to be in a Marxan high priority area when MBS data are complete. • Located in a MN Prairie Plan Core Area (list which one).	• Parcel is in a Prairie Plan Corridor • Parcel is near or adjacent other permanently protected conservation lands with intact habitat.	• Parcel is in a yellow zone of the Marxan prioritization mapping • Isolated parcel: Other habitat or conservation lands within 2 miles	• Isolate parcel within 5 miles of a red, orange, yellow Marxan zone • Prairie within the agricultural matrix (not in a Prairie Plan Core or Corridor) but protecting it would protect significant water resources.	• Isolated parcel greater than 10 miles from a red, orange or yellow Marxan prioritization mapping zone.
Potential for long-term habitat management and enhancement of the parcel (15 pt. maximum)		• SNA ownership of this parcel would improve management options for a larger, contiguous area (e.g. improves ability for prescribed fire mgmt, invasive species control, better coordination with conservation partners).	• Parcel has no major limitations to management (had good access to all parts that might require management) • Parcel does not require significant management efforts (minimal invasive issues, no reconstruction, no building removal needed no expectation of heavy use, no proposed trail, etc..)	• Parcel has some major limitations to management. (may have a building, some invasives, junk piles, etc)	• Parcel has significant limitations to management (e.g. surrounding residential development limits Rx fire, exotic weed control issues, canopy community decimated and signs that understory is in peril). • Up to 50% of parcel requires heavy management or restoration	• Restoration and invasive species removal requires multiple efforts over the majority of the parcel. • Expensive and time consuming plant community reconstruction required.
Additional factors (included in the evaluation as appropriate) (15 pt. maximum)		• Jeopardy of parcel: e.g. parcel is in an area where this type of property is experiencing strong development pressure due to gravel mining, cropland conversion, housing, or other imminent threats **AND** parcel contains S1 or S2 ranked communities or T and E species • Landowner is willing to donate significant acreage of parcel • Parcel has geological features of statewide significance	• Jeopardy of parcel: e.g. parcel is in an area where this type of property is experiencing development pressure due to gravel mining, cropland conversion, housing, or other imminent threats	• Parcel provides good cross-section of geological strata or fossil exposure		

Overall summary of the parcel's priority for enrollment based on the evaluation criteria. Writing a succinct summary statement here is very helpful as this statement can be used repeatedly for the fact sheet as well as for future LCCMR, LSOHC, Bonding etc. reports.

Native Plant Communities: Presence within Subsections

*Please note that data for the following subsections are missing or very limited, and all NPC acreages are not representative of future final totals:

Agassiz Lowland, Border Lakes, Chippewa Plain, Little Fork-Vermillion Upland, Nashwauk Upland, Pine Moraines Outwash Plain, St. Louis Moraine, Tamarack Lowland

NPC Presence within Subsections: SNAs	NPC Presence within Subsections: Protected Public Lands (Public and NGO Conservancies)	Protected Acreage		NPC Presence within Subsections: Protected Public and Unprotected Private Lands (Subsections in red are missing protected acreage of NPC type)
ABR_CX				**Agassiz Beach Ridge Complex**
Red River Prairie	Red River Prairie	1505.3		Red River Prairie
AFP_CX		7071.5		**Alder Swamp / Forested Peatland Complex**
	Border Lakes	29.9		Border Lakes
	Hardwood Hills	3.6		Hardwood Hills
Laurentian Uplands	Laurentian Uplands	2614.3		Laurentian Uplands
	Nashwauk Uplands	5.8		Nashwauk Uplands
	North Shore Highlands	2498.0		North Shore Highlands
	Pine Moraines & Outwash Plains	4.2		Pine Moraines & Outwash Plains
	St. Louis Moraines	37.7		St. Louis Moraines
	Tamarack Lowlands	7.2		Tamarack Lowlands
	Toimi Uplands	1870.9		Toimi Uplands
AIP_CX		6979.7		**Agassiz Interbeach Prairie Complex**
Aspen Parklands	Aspen Parklands	6471.4		Aspen Parklands
	Red River Prairie	508.3		Red River Prairie
AOX_CX		2257.7		**Aspen - Oak Woodland Complex**

	Aspen Parklands	2257.7	Aspen Parklands
APn80		127.1	**Northern Spruce Bog**
	Laurentian Uplands	6.5	Laurentian Uplands
	St. Louis Moraines	2.8	St. Louis Moraines
	Tamarack Lowlands	117.8	Tamarack Lowlands
APn80a		16615.8	**Black Spruce Bog**
	Agassiz Lowlands	3225.9	Agassiz Lowlands
	Border Lakes	67.3	Border Lakes
Laurentian Uplands	Laurentian Uplands	2963.3	Laurentian Uplands
	Nashwauk Uplands	12.5	Mille Lacs Uplands
	North Shore Highlands	4762.8	Nashwauk Uplands
	St. Louis Moraines	198.8	North Shore Highlands
	Tamarack Lowlands	90.0	St. Louis Moraine
	Toimi Uplands	5295.3	Tamarack Lowlands
			Toimi Uplands
APn80a1		1725.4	**Black Spruce Bog: Treed Subtype**
	Border Lakes	21.5	Border Lakes
Laurentian Uplands	Laurentian Uplands	816.2	Laurentian Uplands
	Nashwauk Uplands	42.5	Nashwauk Uplands
	North Shore Highlands	519.5	North Shore Highlands
	St. Louis Moraines	325.7	St. Louis Moraine
APn80a2		2188.5	**Black Spruce Bog: Semi-Treed Subtype**
	Agassiz Lowlands	2.9	Agassiz Lowlands
	Border Lakes	11.4	Border Lakes
Laurentian Uplands	Laurentian Uplands	403.8	Laurentian Uplands
	Mille Lacs Uplands	307.3	Mille Lacs Uplands
	Nashwauk Uplands	167.9	Nashwauk Uplands
	North Shore Highlands	390.0	North Shore Highlands
	St. Louis Moraines	905.2	St. Louis Moraine
APn81		11529.2	**Northern Poor Conifer Swamp**
	Agassiz Lowlands	828.9	Agassiz Lowlands
	Aspen Parklands	2356.1	Aspen Parklands

	Border Lakes	56.7	Border Lakes
	Chippewa Plains	24.6	Chippewa Plains
Laurentian Uplands	Laurentian Uplands	2051.8	Laurentian Uplands
	Mille Lacs Uplands	212.2	Mille Lacs Uplands
	Nashwauk Uplands	15.5	Nashwauk Uplands
	North Shore Highlands	4619.4	North Shore Highlands
	Pine Moraines & Outwash Plains	2.7	Pine Moraine & Outwash Plains
	St. Louis Moraines	561.2	Glacial Lake Superior Plain
	Toimi Uplands	800.1	St. Louis Moraine
			Toimi Uplands
APn81a		12779.6	**Poor Black Spruce Swamp**
	Agassiz Lowlands	1050.6	Agassiz Lowlands
	Border Lakes	447.4	Border Lakes
	Glacial Lake Superior Plain	144.6	Glacial Lake Superior Plain
Laurentian Uplands	Laurentian Uplands	3962.3	Laurentian Uplands
	Mille Lacs Uplands	850.1	Mille Lacs Uplands
	Nashwauk Uplands	19.8	Nashwauk Uplands
	North Shore Highlands	2069.9	North Shore Highlands
	St. Louis Moraines	431.8	St. Louis Moraine
	Tamarack Lowlands	17.0	Tamarack Lowlands
	Toimi Uplands	3786.1	Toimi Uplands
APn81b		8023.7	**Poor Tamarack - Black Spruce Swamp**
	Agassiz Lowlands	650.9	Agassiz Lowlands
	Border Lakes	77.2	Big Woods
	Chippewa Plains	40.1	Border Lakes
	Hardwood Hills	21.1	Chippewa Plains
Laurentian Uplands	Laurentian Uplands	3750.7	Hardwood Hills
	Mille Lacs Uplands	531.5	Laurentian Uplands
	Nashwauk Uplands	145.8	Mille Lacs Uplands
	North Shore Highlands	497.4	Nashwauk Uplands
	Pine Moraines & Outwash Plains	35.0	North Shore Highlands
	St. Louis Moraines	990.8	Pine Moraine & Outwash Plains
	Tamarack Lowlands	76.7	St. Louis Moraines
	Toimi Uplands	1206.5	Tamarack Lowlands
			Toimi Uplands

APn81b1		262.5	**Poor Tamarack - Black Spruce Swamp: Black Spruce Subtype**
	Laurentian Uplands	53.7	Laurentian Uplands
	Mille Lacs Uplands	8.5	Mille Lacs Uplands
	North Shore Highlands	200.2	North Shore Highlands
			St. Paul Baldwin Plains
APn81b2		**3294.3**	**Poor Tamarack - Black Spruce Swamp: Tamarack Subtype**
	Aspen Parklands	2252.1	Aspen Parklands
Laurentian Uplands	Laurentian Uplands	168.0	Hardwood Hills
	Mille Lacs Uplands	464.8	Laurentian Uplands
	North Shore Highlands	409.4	Mille Lacs Uplands
			North Shore Highlands
			Pine Moraine & Outwash Plains
APn90		**2329.3**	**Northern Open Bog**
	Agassiz Lowlands	2073.4	Agassiz Lowlands
Laurentian Uplands	Laurentian Uplands	241.7	Laurentian Uplands
	Mille Lacs Uplands	14.2	Mille Lacs Uplands
			North Shore Highlands
APn90a		**2322.2**	**Low Shrub Bog**
	Border Lakes	15.2	Border Lakes
Laurentian Uplands	Laurentian Uplands	239.7	Laurentian Uplands
	Mille Lacs Uplands	28.6	Mille Lacs Uplands
	Nashwauk Uplands	5.3	Nashwauk Uplands
	North Shore Highlands	76.5	North Shore Highlands
	St. Louis Moraines	1927.0	St. Louis Moraine
	Toimi Uplands	29.9	Toimi Uplands
APn90b		**2.7**	**Graminoid Bog**
	Laurentian Uplands	2.7	Laurentian Uplands
			Mille Lacs Uplands
APn90b1		**115.1**	**Graminoid Bog: Typic Subtype**

	Agassiz Lowlands	28.4	Agassiz Lowlands
	Laurentian Uplands	40.9	Laurentian Uplands
	North Shore Highlands	19.6	North Shore Highlands
	Toimi Uplands	26.3	Toimi Uplands
APn91		3696.1	**Northern Poor Fen**
	Border Lakes	1.8	Border Lakes
Laurentian Uplands	Laurentian Uplands	234.3	Hardwood Hills
	Mille Lacs Uplands	650.4	Laurentian Uplands
	Nashwauk Uplands	102.2	Mille Lacs Uplands
	North Shore Highlands	456.1	Nashwauk Uplands
	Pine Moraines & Outwash Plains	3.0	North Shore Highlands
	St. Louis Moraines	634.6	Pine Moraine & Outwash Plains
	Tamarack Lowlands	1562.3	St. Louis Moraine
	Toimi Uplands	51.4	Tamarack Lowlands
			Toimi Uplands
APn91a		**10620.8**	**Low Shrub Poor Fen**
	Agassiz Lowlands	351.1	Agassiz Lowlands
Anoka Sand Plain	Anoka Sand Plain	48.4	Anoka Sand Plain
	Aspen Parklands	4378.2	Aspen Parklands
	Border Lakes	358.2	Border Lakes
	Hardwood Hills	242.4	Hardwood Hills
Laurentian Uplands	Laurentian Uplands	1655.6	Laurentian Uplands
	Littlefork-Vermillion Uplands	3.6	Littlefork-Vermillion Uplands
	Mille Lacs Uplands	581.2	Mille Lacs Uplands
	Nashwauk Uplands	18.0	Nashwauk Uplands
	North Shore Highlands	710.4	North Shore Highlands
Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	863.5	Pine Moraine & Outwash Plains
	St. Louis Moraines	1255.7	St. Louis Moraine
	St. Paul-Baldwin Plains	3.5	St. Paul Baldwin Plains
	Toimi Uplands	150.8	Toimi Uplands
APn91b		**1532.8**	**Graminoid Poor Fen (Basin)**
	Agassiz Lowlands	227.6	Agassiz Lowlands
	Border Lakes	22.8	Big Woods
	Hardwood Hills	7.6	Border Lakes

Laurentian Uplands	Laurentian Uplands	414.2	Hardwood Hills
	Mille Lacs Uplands	23.4	Laurentian Uplands
	Nashwauk Uplands	10.4	Mille Lacs Uplands
	North Shore Highlands	150.9	Nashwauk Uplands
	Pine Moraines & Outwash Plains	396.7	North Shore Highlands
	St. Louis Moraines	267.9	Pine Moraine & Outwash Plains
	Toimi Uplands	11.4	St. Louis Moraine
			Toimi Uplands
APn91c		**77.4**	**Graminoid Poor Fen (Water Track)**
	Laurentian Uplands	26.8	Laurentian Uplands
	Nashwauk Uplands	3.7	Nashwauk Uplands
	North Shore Highlands	19.1	North Shore Highlands
	St. Louis Moraines	27.8	St. Louis Moraines
APn91c1		**209.7**	**Graminoid Poor Fen (Water Track): Featureless Water Track Subtype**
Laurentian Uplands	Laurentian Uplands	209.7	Laurentian Uplands
APn91c2		**466.9**	**Graminoid Poor Fen (Water Track): Flark Subtype**
Laurentian Uplands	Laurentian Uplands	466.9	Laurentian Uplands
ASBH_CX		**437.4**	**Alder Swamp / Wet Alder Swamp / Wet-Mesic Boreal Hardwood-Conifer Forest**
	Glacial Lake Superior Plain	437.4	Glacial Lake Superior Plain
ASM_CX		**240.5**	**Alder Swamp / Northern Sedge Meadow Complex**
	Glacial Lake Superior Plain	66.7	Glacial Lake Superior Plain
	Mille Lacs Uplands	173.8	Mille Lacs Uplands
ASP_CX		**26205.9**	**Aspen Parkland Complex**
Aspen Parklands	Aspen Parklands	26205.9	Aspen Parklands

			Agassiz Shoreline Ridge and Swale Complex
ASR_CX		**1732.5**	
	Aspen Parklands	1732.5	Aspen Parklands
AWAF_CX		**23297.9**	**Aspen Woodland/Forest Complex**
Aspen Parklands	Aspen Parklands	23297.9	Aspen Parklands
BD_CX		**358.1**	**Complex**
	Chippewa Plains	7.6	Chippewa Plains
	Laurentian Uplands	13.4	Laurentian Uplands
	Mille Lacs Uplands	5.5	Mille Lacs Uplands
	Nashwauk Uplands	9.3	Nashwauk Uplands
	North Shore Highlands	2.1	North Shore Highlands
	Pine Moraines & Outwash Plains	287.6	Pine Moraines & Outwash Plains
	St. Louis Moraines	21.3	St. Louis Moraines
	Toimi Uplands	11.2	Toimi Uplands
BW_CX		**12310.4**	**Beaver Wetland Complex**
Border Lakes	Border Lakes	252.2	Border Lakes
	Glacial Lake Superior Plain	218.8	Glacial Lake Superior Plain
	Hardwood Hills	86.0	Hardwood Hills
Laurentian Uplands	Laurentian Uplands	1461.6	Laurentian Uplands
	Mille Lacs Uplands	457.3	Mille Lacs Uplands
	Minnesota River Prairie	0.4	Minnesota River Prairie
	Nashwauk Uplands	88.5	Nashwauk Uplands
North Shore Highlands	North Shore Highlands	6368.9	North Shore Highlands
Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	1271.5	Pine Moraines & Outwash Plains
	St. Louis Moraines	238.0	St. Louis Moraines
	St. Paul-Baldwin Plains	17.8	St. Paul-Baldwin Plains
	Toimi Uplands	1849.4	Toimi Uplands
BYF_CX		**379.7**	**Complex**
	Hardwood Hills	103.1	Hardwood Hills
	Pine Moraines & Outwash Plains	187.6	Pine Moraines & Outwash Plains
	Toimi Uplands	89.0	Toimi Uplands
CMH_CX		**1146.0**	**Complex**

	Mille Lacs Uplands	1146.0	Mille Lacs Uplands
CSW_CX		**155.5**	**Conifer Swamp Complex**
	Aspen Parklands	155.5	Aspen Parklands
CT		**0.4**	**Cliff/Talus System**
	North Shore Highlands	0.4	North Shore Highlands
CTn11		**0.6**	**Northern Dry Cliff**
	Nashwauk Uplands	0.6	Nashwauk Uplands
CTn11a		**39.1**	**Dry Mafic Cliff (Northern)**
	Glacial Lake Superior Plain	0.4	Glacial Lake Superior Plain
	North Shore Highlands	38.8	North Shore Highlands
CTn11d		**6.4**	**Dry Felsic Cliff (Northern)**
	North Shore Highlands	6.4	North Shore Highlands
CTn11e			**Dry Sandstone Cliff (Northern)**
	Glacial Lake Superior Plain		Glacial Lake Superior Plain
CTn12a		**31.3**	**Dry Open Talus (Northern)**
	Laurentian Uplands	1.5	Laurentian Uplands
	North Shore Highlands	29.8	North Shore Highlands
CTn12b		**5.4**	**Mesic Open Talus (Northern)**
	Border Lakes	0.3	Border Lakes
	North Shore Highlands	5.2	North Shore Highlands
CTn24a		**32.2**	**Dry Scrub Talus (Northern)**
	North Shore Highlands	32.2	North Shore Highlands
CTn24b		**34.6**	**Mesic Scrub Talus (Northern)**
North Shore Highlands	North Shore Highlands	38.9	North Shore Highlands
CTn32		**1.7**	**Mesic Cliff (Northern)**
	North Shore Highlands	1.7	North Shore Highlands

CTn32a		**160.3**	**Mesic Mafic Cliff (Northern)**
Border Lakes	Border Lakes	1.4	Border Lakes
	Laurentian Uplands	3.3	Laurentian Uplands
North Shore Highlands	North Shore Highlands	157.4	North Shore Highlands
CTn32d		**5.4**	**Mesic Felsic Cliff (Northern)**
	Border Lakes	2.3	Border Lakes
	North Shore Highlands	3.1	North Shore Highlands
CTn42		**0.3**	**Northern Wet Cliff**
	North Shore Highlands	0.3	North Shore Highlands
CTn42a		**7.3**	**Wet Mafic Cliff (Northern)**
	North Shore Highlands	7.3	North Shore Highlands
CTn42c		**1.4**	**Wet Felsic Cliff (Northern)**
	North Shore Highlands	1.4	North Shore Highlands
CTn42d		**1.3**	**Wet Sandstone Cliff (Northern)**
	North Shore Highlands	1.3	North Shore Highlands
CTs12		**520.4**	**Southern Dry Cliff**
	Rochester Plateau	2.3	Rochester Plateau
The Blufflands	The Blufflands	518.1	The Blufflands
CTs12a		**2.3**	**Dry Sandstone Cliff (Southern)**
	Rochester Plateau	2.3	Rochester Plateau
			St. Paul Baldwin Plains
			The Blufflands
CTs12b		**17.6**	**Dry Limestone - Dolomite Cliff (Southern)**
	Rochester Plateau	0.0	Rochester Plateau
The Blufflands	The Blufflands	17.6	The Blufflands
CTs12c		**17.6**	**Dry Sioux Quartzite Cliff (Southern)**
	Minnesota River Prairie	0.0	Minnesota River Prairie

CTs23		**6.9**	**Southern Open Talus**
	The Blufflands	6.9	The Blufflands
CTs23b		**2.7**	**Mesic Limestone - Dolomite Talus (Southern)**
	The Blufflands	2.7	The Blufflands
CTs33		**75.9**	**Southern Mesic Cliff**
	The Blufflands	75.9	The Blufflands
			Rochester Plateau
CTs33a		**21.5**	**Mesic Sandstone Cliff (Southern)**
The Blufflands	The Blufflands	21.5	The Blufflands
CTs33b		**62.6**	**Mesic Limestone - Dolomite Cliff (Southern)**
	Rochester Plateau	4.4	Rochester Plateau
The Blufflands	The Blufflands	58.1	The Blufflands
CTs43a1		**32.1**	**Maderate Cliff: Limestone Subtype**
	Rochester Plateau	0.2	Rochester Plateau
	The Blufflands	31.9	The Blufflands
CTs43a2		**9.5**	**Maderate Cliff: Dolomite Subtype**
	Rochester Plateau	0.0	Rochester Plateau
	The Blufflands	9.4	The Blufflands
CTs46a1		**39.1**	**Algific Talus: Limestone Subtype**
	Rochester Plateau	0.4	Rochester Plateau
The Blufflands	The Blufflands	38.7	The Blufflands
CTs46a2		**49.1**	**Algific Talus: Dolomite Subtype**
	Rochester Plateau	2.7	Rochester Plateau
The Blufflands	The Blufflands	46.3	The Blufflands

CTs53		**5.3**	**Southern Wet Cliff**
	The Blufflands	5.3	The Blufflands
CTs53a		**0.9**	**Wet Sandstone Cliff (Southern)**
	Big Woods	0.5	Big Woods
	St. Paul-Baldwin Plains	0.4	St. Paul-Baldwin Plains
CTu22a		**38.0**	**Exposed Mafic Cliff (Lake Superior)**
North Shore Highlands	North Shore Highlands	38.0	North Shore Highlands
CTu22b		**2.0**	**Exposed Felsic Cliff (Lake Superior)**
	North Shore Highlands	2.0	North Shore Highlands
CTu22c		**2.0**	**Sheltered Mafic Cliff (Lake Superior)**
	North Shore Highlands	2.0	North Shore Highlands
DCT_CX		**55.6**	**Complex**
	North Shore Highlands	55.6	North Shore Highlands
DPW_CX		**281.9**	**Complex**
	Aspen Parklands	11.9	Aspen Parklands
	Hardwood Hills	8.0	Hardwood Hills
	Minnesota River Prairie	259.3	Minnesota River Prairie
	Red River Prairie	2.8	Red River Prairie
FCT_CX		**73.1**	**Complex**
	North Shore Highlands	73.1	North Shore Highlands
FDc23		**423.5**	**Central Dry Pine Woodland**
	Chippewa Plains	294.7	Chippewa Plains
	Pine Moraines & Outwash Plains	128.8	Hardwood Hills
			Pine Moraines & Outwash Plains
FDc23a		**248.9**	**Jack Pine - (Yarrow) Woodland**
	Chippewa Plains	196.6	Chippewa Plains
	Pine Moraines & Outwash Plains	52.3	Pine Moraines & Outwash Plains

FDc23a2		**16.3**	**Jack Pine - (Yarrow) Woodland: Bur Oak - Aspen Subtype**
	Anoka Sand Plain	16.3	Anoka Sand Plain
			Hardwood Hills
FDc24		**493.9**	**Central Rich Dry Pine Woodland**
	Aspen Parklands	25.8	Aspen Parklands
	Chippewa Plains	19.4	Chippewa Plains
	Hardwood Hills	110.9	Hardwood Hills
	Pine Moraines & Outwash Plains	337.8	Pine Moraines & Outwash Plains
FDc24a		**2389.2**	**Jack Pine - (Bush Honeysuckle) Woodland**
	Anoka Sand Plain	698.3	Anoka Sand Plain
	Chippewa Plains	708.4	Chippewa Plains
Pine Moraines & Outwash Pla	Pine Moraines & Outwash Plains	982.5	Pine Moraines & Outwash Plains
FDc25		**520.2**	**Central Dry Oak-Aspen (Pine) Woodland**
	Anoka Sand Plain	22.6	Anoka Sand Plain
	Mille Lacs Uplands	497.6	Mille Lacs Uplands
FDc25a		**2837.7**	**Jack Pine - Oak Woodland**
	Mille Lacs Uplands	2837.7	Mille Lacs Uplands
FDc25b		**4952.2**	**Oak - Aspen Woodland**
Anoka Sand Plain	Anoka Sand Plain	119.8	Anoka Sand Plain
Mille Lacs Uplands	Mille Lacs Uplands	4669.6	Mille Lacs Uplands
	St. Croix Moraine	2.5	St. Croix Moraine
	St. Paul-Baldwin Plains	160.2	St. Paul-Baldwin Plains
FDc34		**86.7**	**Central Dry-Mesic Pine-Hardwood Forest**
	Chippewa Plains	4.3	Chippewa Plains
	Pine Moraines & Outwash Plains	82.4	Pine Moraines & Outwash Plains
FDc34a		**10601.7**	**Red Pine - White Pine Forest**
	Chippewa Plains	808.8	Chippewa Plains
	Mille Lacs Uplands	65.0	Hardwood Hills
Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	9522.3	Mille Lacs Uplands

	St. Louis Moraines	205.7	Pine Moraines & Outwash Plains St. Louis Moraines
FDc34b		**2570.0**	**Oak - Aspen Forest**
	Chippewa Plains	143.7	Chippewa Plains
	Hardwood Hills	15.7	Hardwood Hills
Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	2377.1	Pine Moraines & Outwash Plains
	St. Louis Moraines	26.5	St. Louis Moraines
	St. Paul-Baldwin Plains	7.3	St. Paul-Baldwin Plains
FDn12		**323.9**	**Northern Dry Sand Pine Woodland**
	Agassiz Lowlands	31.9	Agassiz Lowlands
	St. Louis Moraines	291.9	St. Louis Moraines
FDn12a		**2123.9**	**Jack Pine Woodland (Sand)**
	Agassiz Lowlands	2123.9	Agassiz Lowlands
FDn12b		**1095.3**	**Red Pine Woodland (Sand)**
	Agassiz Lowlands	1082.6	Agassiz Lowlands
	Nashwauk Uplands	12.5	Nashwauk Uplands
	North Shore Highlands	0.2	North Shore Highlands
FDn22		**1.9**	**Northern Dry Bedrock Pine (Oak) Woodland**
	Border Lakes	1.9	Border Lakes
FDn22a		**2.6**	**Jack Pine Woodland (Bedrock)**
	North Shore Highlands	2.6	North Shore Highlands
FDn22d		**22.4**	**Red Pine - White Pine Woodland (Eastcentral Bedrock)**
	Glacial Lake Superior Plain	9.8	Glacial Lake Superior Plain
	Mille Lacs Uplands	12.6	Mille Lacs Uplands
FDn32		**665.7**	**Northern Poor Dry-Mesic Mixed Woodland**
	Laurentian Uplands	245.3	Laurentian Uplands

	North Shore Highlands	403.1	North Shore Highlands
	Toimi Uplands	17.2	Toimi Uplands
FDn32a		**235.9**	**Red Pine - White Pine Woodland (Canadian Shield)**
	Border Lakes	24.8	Border Lakes
	North Shore Highlands	211.1	North Shore Highlands
FDn32b		**19.4**	**Red Pine - White Pine Woodland (Minnesota Point)**
North Shore Highlands	North Shore Highlands	19.4	North Shore Highlands
FDn32c		**6764.5**	**Black Spruce - Jack Pine Woodland**
	Border Lakes	431.7	Border Lakes
	Laurentian Uplands	1989.8	Laurentian Uplands
	North Shore Highlands	4343.0	North Shore Highlands
FDn32c1		**47.3**	**Black Spruce - Jack Pine Woodland: Jack Pine - Balsam Fir Subtype**
	Agassiz Lowlands	3.8	Agassiz Lowlands
	Laurentian Uplands	33.8	Laurentian Uplands
North Shore Highlands	North Shore Highlands	9.7	North Shore Highlands
FDn32c2		**83.6**	**Black Spruce - Jack Pine Woodland: Black Spruce - Feathermoss Subtype**
	Border Lakes	4.5	Border Lakes
	Laurentian Uplands	65.4	Laurentian Uplands
	North Shore Highlands	4.4	North Shore Highlands
	North Shore Highlands	9.3	North Shore Highlands
FDn32c3		**1107.4**	**Black Spruce - Jack Pine Woodland: Jack Pine - Black Spruce - Aspen Subtype**
	Border Lakes	135.8	Border Lakes
	Laurentian Uplands	971.7	Laurentian Uplands
			North Shore Highlands

FDn32d		**1337.2**	**Jack Pine - Black Spruce Woodland (Sand)**
	Agassiz Lowlands	435.7	Agassiz Lowlands
	Laurentian Uplands	311.7	Laurentian Uplands
	North Shore Highlands	191.6	North Shore Highlands
	Toimi Uplands	398.2	Toimi Uplands
FDn32e		**114.2**	**Spruce - Fir Woodland (North Shore)**
	North Shore Highlands	114.2	North Shore Highlands
FDn33		**623.0**	**Northern Dry-Mesic Mixed Woodland**
	Agassiz Lowlands	2.5	Agassiz Lowlands
	Chippewa Plains	67.9	Chippewa Plains
	Laurentian Uplands	49.1	Laurentian Uplands
	Nashwauk Uplands	36.4	Nashwauk Uplands
	North Shore Highlands	266.2	North Shore Highlands
	Pine Moraines & Outwash Plains	86.7	Pine Moraines & Outwash Plains
	St. Louis Moraines	67.8	St. Louis Moraines
	Toimi Uplands	46.3	Toimi Uplands
FDn33a		**4672.2**	**Red Pine - White Pine Woodland**
	Agassiz Lowlands	1076.6	Agassiz Lowlands
	Border Lakes	211.9	Border Lakes
	Chippewa Plains	178.1	Chippewa Plains
	Laurentian Uplands	46.6	Laurentian Uplands
	Littlefork-Vermillion Uplands	15.4	Littlefork-Vermillion Uplands
	Mille Lacs Uplands	95.3	Mille Lacs Uplands
	North Shore Highlands	174.6	North Shore Highlands
	Pine Moraines & Outwash Plains	2002.4	Pine Moraines & Outwash Plains
	St. Louis Moraines	871.3	St. Louis Moraines
FDn33a1		**2353.4**	**Red Pine - White Pine Woodland: Balsam Fir Subtype**
	Chippewa Plains	214.6	Chippewa Plains
	Glacial Lake Superior Plain	2.8	Glacial Lake Superior Plain
	Littlefork-Vermillion Uplands	150.9	Littlefork-Vermillion Uplands
	Nashwauk Uplands	1798.3	Nashwauk Uplands
	North Shore Highlands	58.6	North Shore Highlands

	Pine Moraines & Outwash Plains	128.1	Pine Moraines & Outwash Plains
FDn33a2		**239.7**	**Red Pine - White Pine Woodland: Mountain Maple Subtype**
	Agassiz Lowlands	25.5	Agassiz Lowlands
	Glacial Lake Superior Plain	1.0	Glacial Lake Superior Plain
	Mille Lacs Uplands	0.0	Mille Lacs Uplands
	North Shore Highlands	201.2	North Shore Highlands
	Pine Moraines & Outwash Plains	11.9	Pine Moraines & Outwash Plains
FDn33b		**678.2**	**Aspen - Birch Woodland**
	Agassiz Lowlands	125.6	Agassiz Lowlands
Border Lakes	Border Lakes	8.2	Border Lakes
	Chippewa Plains	7.3	Chippewa Plains
	Glacial Lake Superior Plain	11.5	Glacial Lake Superior Plain
North Shore Highlands	North Shore Highlands	525.6	North Shore Highlands
FDn33c		**6.3**	**Black Spruce Woodland**
	Laurentian Uplands	6.3	Laurentian Uplands
FDn43		**30326.8**	**Northern Mesic Mixed Forest**
	Agassiz Lowlands	3.7	Agassiz Lowlands
	Border Lakes	1258.2	Border Lakes
Laurentian Uplands	Laurentian Uplands	6416.5	Laurentian Uplands
	Nashwauk Uplands	54.0	Nashwauk Uplands
	North Shore Highlands	21765.4	North Shore Highlands
	Toimi Uplands	829.0	Toimi Uplands
FDn43a		**11040.4**	**White Pine - Red Pine Forest**
	Border Lakes	1064.1	Border Lakes
Laurentian Uplands	Laurentian Uplands	5735.3	Laurentian Uplands
	Mille Lacs Uplands	21.3	Mille Lacs Uplands
	Nashwauk Uplands	299.0	Nashwauk Uplands
	North Shore Highlands	2133.3	North Shore Highlands
	Tamarack Lowlands	10.0	Tamarack Lowlands
	Toimi Uplands	1777.3	Toimi Uplands

FDn43b		**10687.3**	**Aspen - Birch Forest**
	Border Lakes	52.1	Border Lakes
	Glacial Lake Superior Plain	64.9	Glacial Lake Superior Plain
	Laurentian Uplands	137.8	Laurentian Uplands
	Mille Lacs Uplands	357.8	Mille Lacs Uplands
North Shore Highlands	North Shore Highlands	10033.0	North Shore Highlands
	Toimi Uplands	41.8	Toimi Uplands
FDn43b1		**70953.1**	**Aspen - Birch Forest: Balsam Fir Subtype**
Border Lakes	Border Lakes	3738.8	Border Lakes
Laurentian Uplands	Laurentian Uplands	19371.3	Laurentian Uplands
	Mille Lacs Uplands	44.9	Mille Lacs Uplands
	Nashwauk Uplands	915.0	Nashwauk Uplands
North Shore Highlands	North Shore Highlands	33080.4	North Shore Highlands
	Tamarack Lowlands	49.2	Tamarack Lowlands
	Toimi Uplands	13753.6	Toimi Uplands
FDn43b2		**8523.0**	**Aspen - Birch Forest: Hardwood Subtype**
	Border Lakes	100.8	Border Lakes
	Laurentian Uplands	55.7	Laurentian Uplands
	Mille Lacs Uplands	75.5	Mille Lacs Uplands
North Shore Highlands	North Shore Highlands	8171.1	North Shore Highlands
FDn43c		**15587.7**	**Upland White Cedar Forest**
Border Lakes	Border Lakes	916.3	Border Lakes
	Glacial Lake Superior Plain	65.6	Glacial Lake Superior Plain
Laurentian Uplands	Laurentian Uplands	1079.1	Laurentian Uplands
	Nashwauk Uplands	23.0	Nashwauk Uplands
North Shore Highlands	North Shore Highlands	12963.4	North Shore Highlands
	Toimi Uplands	563.4	Toimi Uplands
FDn44		**33.4**	**Northern Mesic Mixed Forest**
	Laurentian Uplands	33.4	Laurentian Uplands
			Toimi Uplands
FDs27a		**3.6**	**Jack Pine - Oak Woodland (Sand)**
The Blufflands	The Blufflands	3.6	The Blufflands

FDs27b		**134.5**	**White Pine - Oak Woodland (Sand)**
Oak Savanna	Oak Savanna	16.6	Oak Savanna
	Rochester Plateau	2.3	Rochester Plateau
	The Blufflands	115.6	The Blufflands
St. Paul-Baldwin Plains	St. Paul-Baldwin Plains		St. Paul-Baldwin Plains
FDs27c		**632.5**	**Black Oak - White Oak Woodland (Sand)**
	Oak Savanna	7.7	Oak Savanna
The Blufflands	The Blufflands	624.9	The Blufflands
			Rochester Plateau
FDs36		**46.8**	**Southern Dry-Mesic Oak-Aspen Forest**
	Oak Savanna	40.6	Oak Savanna
	Rochester Plateau	1.0	Rochester Plateau
	The Blufflands	5.3	The Blufflands
FDs36a		**3001.8**	**Bur Oak - Aspen Forest**
	Aspen Parklands	108.2	Aspen Parklands
	Chippewa Plains	30.7	Chippewa Plains
Hardwood Hills	Hardwood Hills	2359.5	Hardwood Hills
Red River Prairie	Red River Prairie	503.4	Red River Prairie
			Rochester Plateau
FDs37		**3727.2**	**Southern Dry-Mesic Oak (Maple) Woodland**
Anoka Sand Plain	Anoka Sand Plain	3005.0	Anoka Sand Plain
	Big Woods	0.1	Big Woods
	Minnesota River Prairie	33.7	Hardwood Hills
	Oak Savanna	60.9	Mille Lacs Uplands
	St. Paul-Baldwin Plains	627.5	Minnesota River Prairie
			Oak Savanna
			Rochester Plateau
			St. Paul-Baldwin Plains
FDs37a		**2864.7**	**Oak - (Red Maple) Woodland**
Anoka Sand Plain	Anoka Sand Plain	1740.4	Anoka Sand Plain

	Hardwood Hills	11.7	Big Woods
Mille Lacs Uplands	Mille Lacs Uplands	25.0	Hardwood Hills
	St. Croix Moraine	20.8	Mille Lacs Uplands
	St. Paul-Baldwin Plains	1066.9	Glacial Lake Superior Plain
			St. Croix Moraine
			St. Paul-Baldwin Plains
FDs37b		**4223.2**	**Pin Oak - Bur Oak Woodland**
Anoka Sand Plain	Anoka Sand Plain	400.3	Anoka Sand Plain
Big Woods	Big Woods	582.4	Big Woods
	Coteau Moraines	0.2	Coteau Moraine
	Hardwood Hills	2561.8	Hardwood Hills
	Minnesota River Prairie	463.8	Mille Lacs Uplands
	Oak Savanna	34.0	Minnesota River Prairie
	Pine Moraines & Outwash Plains	158.9	Oak Savanna
Rochester Plateau	Rochester Plateau	13.4	Pine Moraine & Outwash Plains
	St. Paul-Baldwin Plains	26.6	Rochester Plateau
			St. Paul Baldwin Plains
FDs38		**565.6**	**Southern Dry Mesic Oak Hickory Forest**
	Rochester Plateau	18.2	Rochester Plateau
	The Blufflands	547.4	The Blufflands
FDs38a	**FDs38a**	**5352.8**	**Oak - Shagbark Hickory Woodland**
	Oak Savanna	32.8	Oak Savanna
Rochester Plateau	Rochester Plateau	254.7	Rochester Plateau
The Blufflands	The Blufflands	5065.3	The Blufflands
FDw24		**1139.7**	**Northwestern Dry-Mesic Oak Woodland**
	Aspen Parklands	1139.7	Aspen Parklands
			Hardwood Hills
FDw24a	**FDw24a**	**212.3**	**Bur Oak - (Prairie Herb) Woodland**
	Aspen Parklands	212.3	Aspen Parklands
FDw24b	**FDw24b**	**124.0**	**Bur Oak - (Forest Herb) Woodland**
	Aspen Parklands	124.0	Aspen Parklands

			Northwestern Mesic Aspen-Oak Woodland
FDw34		**1018.6**	
Aspen Parklands	Aspen Parklands	1013.4	Aspen Parklands
Red River Prairie	Red River Prairie	5.2	Red River Prairie
FDw34a	**FDw34a**	**537.1**	**Aspen - (Prairie Herb) Woodland**
	Red River Prairie	537.1	Aspen Parklands
			Red River Prairie
			Northwestern Mesic Aspen-Oak Woodland
FDw35		**5.4**	
Red River Prairie	Red River Prairie	5.4	Red River Prairie
			Northwestern Wet-Mesic Aspen Woodland
FDw44		**5825.7**	
	Agassiz Lowlands	100.8	Agassiz Lowlands
	Anoka Sand Plain	24.3	Anoka Sand Plain
Aspen Parklands	Aspen Parklands	5156.0	Aspen Parklands
	Hardwood Hills	11.9	Hardwood Hills
Red River Prairie	Red River Prairie	532.9	Red River Prairie
FDw44a		**264.5**	**Aspen - (Cordgrass) Woodland**
	Aspen Parklands	263.3	Aspen Parklands
	Red River Prairie	1.2	Red River Prairie
FDw44b		**738.7**	**Aspen - (Chokecherry) Woodland**
	Agassiz Lowlands	358.4	Agassiz Lowlands
	Aspen Parklands	380.3	Aspen Parklands
FF		**150.6**	**Floodplain Forest System**
	Hardwood Hills	150.6	Hardwood Hills
			Red River Prairie
FFn57		**109.9**	**Northern Terrace Forest**
	Agassiz Lowlands	39.1	Agassiz Lowlands

	Anoka Sand Plain	5.9	Anoka Sand Plain
	Aspen Parklands	29.3	Aspen Parklands
	Laurentian Uplands	16.1	Hardwood Hills
	North Shore Highlands	15.0	Laurentian Uplands
	Red River Prairie	4.4	North Shore Highlands
			Red River Prairie
FFn57a		**3354.8**	**Black Ash - Silver Maple Terrace Forest**
	Agassiz Lowlands	705.8	Agassiz Lowlands
	Anoka Sand Plain	136.8	Anoka Sand Plain
	Aspen Parklands	389.4	Aspen Parklands
	Glacial Lake Superior Plain	37.6	Glacial Lake Superior Plain
	Mille Lacs Uplands	602.6	Hardwood Hills
	North Shore Highlands	927.8	Mille Lacs Uplands
	Pine Moraines & Outwash Plains	24.2	North Shore Highlands
	Red River Prairie	523.7	Pine Moraines & Outwash Plains
	Toimi Uplands	7.0	Red River Prairie
			Toimi Uplands
FFn67		**37.8**	**Northern Floodplain Forest**
	Agassiz Lowlands	0.7	Agassiz Lowlands
	Anoka Sand Plain	8.3	Anoka Sand Plain
	Aspen Parklands	28.8	Aspen Parklands
			Silver Maple - (Sensitive Fern) Floodplain Forest
FFn67a		**531.9**	
	Agassiz Lowlands	0.4	Agassiz Lowlands
	Anoka Sand Plain	20.8	Anoka Sand Plain
	Mille Lacs Uplands	508.9	Mille Lacs Uplands
	St. Croix Moraine	1.8	St. Croix Moraine
FFs59		**1257.6**	**Southern Terrace Forest**
Anoka Sand Plain	Anoka Sand Plain	52.3	Anoka Sand Plain
	Big Woods	0.3	Big Woods
Coteau Moraines	Coteau Moraines	78.7	Coteau Moraines
	Minnesota River Prairie	228.2	Minnesota River Prairie
	Oak Savanna	171.4	Oak Savanna

	Rochester Plateau	15.2	Rochester Plateau
	St. Paul-Baldwin Plains	492.9	St. Paul-Baldwin Plains
	The Blufflands	218.6	The Blufflands
FFs59a		**4325.4**	**Silver Maple - Green Ash - Cottonwood Terrace Forest**
Anoka Sand Plain	Anoka Sand Plain	161.1	Anoka Sand Plain
Big Woods	Big Woods	130.5	Big Woods
Hardwood Hills	Hardwood Hills	42.2	Hardwood Hills
	Mille Lacs Uplands	62.3	Mille Lacs Uplands
	Minnesota River Prairie	61.3	Minnesota River Prairie
Oak Savanna	Oak Savanna	351.3	Oak Savanna
The Blufflands	The Blufflands	3516.6	Rochester Plateau
			The Blufflands
FFs59b		**2212.5**	**Swamp White Oak Terrace Forest**
	The Blufflands	2212.5	The Blufflands
FFs59c		**2824.1**	**Elm - Ash - Basswood Terrace Forest**
Anoka Sand Plain	Anoka Sand Plain	200.3	Anoka Sand Plain
	Big Woods	21.2	Big Woods
	Hardwood Hills	5.0	Hardwood Hills
	Inner Coteau	30.7	Inner Coteau
	Minnesota River Prairie	218.0	Minnesota River Prairie
Oak Savanna	Oak Savanna	108.0	Oak Savanna
Rochester Plateau	Rochester Plateau	94.9	Rochester Plateau
	The Blufflands	2146.1	St. Paul Baldwin Plains
			The Blufflands
FFs68		**313.4**	**Southern Floodplain Forest**
	Coteau Moraines	7.0	Big Woods
	Minnesota River Prairie	183.5	Coteau Moraines
	Oak Savanna	122.9	Minnesota River Prairie
			Oak Savanna
FFs68a		**13988.9**	**Silver Maple - (Virginia Creeper) Floodplain Forest**

Anoka Sand Plain	Anoka Sand Plain	644.6	Anoka Sand Plain
Big Woods	Big Woods	1403.8	Big Woods
	Hardwood Hills	0.0	Glacial Lake Superior Plain
	Mille Lacs Uplands	7.3	Hardwood Hills
Minnesota River Prairie	Minnesota River Prairie	1235.6	Minnesota River Prairie
	St. Croix Moraine	0.2	Minnesota River Prairie
St. Paul-Baldwin Plains	St. Paul-Baldwin Plains	595.2	St. Croix Moraine
The Blufflands	The Blufflands	10147.0	St. Paul-Baldwin Plains
			The Blufflands
FPn62a		**17982.1**	**Rich Black Spruce Swamp (Basin)**
	Border Lakes	193.3	Border Lakes
Laurentian Uplands	Laurentian Uplands	11726.8	Laurentian Uplands
	Nashwauk Uplands	2.3	Nashwauk Uplands
North Shore Highlands	North Shore Highlands	4821.2	North Shore Highlands
	Toimi Uplands	1238.5	Toimi Uplands
FPn63		**969.7**	**Northern Cedar Swamp**
	Border Lakes	8.8	Border Lakes
	Nashwauk Uplands	2.8	Nashwauk Uplands
	North Shore Highlands	916.1	North Shore Highlands
	Pine Moraines & Outwash Plains	2.8	Pine Moraines & Outwash Plains
	Tamarack Lowlands	39.1	Tamarack Lowlands
FPn63a		**13229.8**	**White Cedar Swamp (Northeastern)**
	Border Lakes	529.5	Border Lakes
	Glacial Lake Superior Plain	92.3	Glacial Lake Superior Plain
Laurentian Uplands	Laurentian Uplands	4329.0	Laurentian Uplands
	Nashwauk Uplands	1.4	Nashwauk Uplands
	North Shore Highlands	6132.9	North Shore Highlands
	Toimi Uplands	2144.6	Toimi Uplands
FPn63b		**125.1**	**White Cedar Swamp (Northcentral)**
	Chippewa Plains	0.1	Chippewa Plains
	Pine Moraines & Outwash Plains	100.4	Pine Moraines & Outwash Plains
	St. Louis Moraines	24.7	St. Louis Moraines

FPn63c		**1675.2**	**White Cedar Swamp (Northwestern)**
	Agassiz Lowlands	1675.2	Agassiz Lowlands
FPn71		**1060.3**	**Northern Rich Spruce Swamp (Water Track)**
	Agassiz Lowlands	1060.3	Agassiz Lowlands
FPn71a		**5251.0**	**Rich Black Spruce Swamp (Water Track)**
	Agassiz Lowlands	5221.9	Agassiz Lowlands
	North Shore Highlands	29.1	North Shore Highlands
FPn72a		**876.6**	**Rich Tamarack Swamp (Eastcentral)**
	Mille Lacs Uplands	876.6	Mille Lacs Uplands
FPn73		**3248.1**	**Northern Rich Alder Swamp**
	Agassiz Lowlands	176.3	Agassiz Lowlands
	Aspen Parklands	189.4	Aspen Parklands
	Chippewa Plains	34.4	Chippewa Plains
	Glacial Lake Superior Plain	43.1	Glacial Lake Superior Plain
	Mille Lacs Uplands	85.8	Mille Lacs Uplands
	North Shore Highlands	2678.9	North Shore Highlands
	St. Louis Moraines	34.6	St. Louis Moraines
	Toimi Uplands	5.6	Toimi Uplands
FPn73a		**15838.3**	**Alder - (Maple - Loosestrife) Swamp**
	Agassiz Lowlands	2343.2	Agassiz Lowlands
Anoka Sand Plain	Anoka Sand Plain	790.0	Anoka Sand Plain
	Big Woods	3.9	Big Woods
	Border Lakes	78.2	Border Lakes
	Chippewa Plains	5.6	Chippewa Plains
	Glacial Lake Superior Plain	7.7	Glacial Lake Superior Plain
Hardwood Hills	Hardwood Hills	381.6	Hardwood Hills
Laurentian Uplands	Laurentian Uplands	1149.9	Laurentian Uplands
	Littlefork-Vermillion Uplands	4.1	Littlefork-Vermillion Uplands
	Mille Lacs Uplands	1657.4	Mille Lacs Uplands
	Nashwauk Uplands	7.8	Nashwauk Uplands
North Shore Highlands	North Shore Highlands	5443.8	North Shore Highlands

Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	2218.8	Pine Moraines & Outwash Plains
	St. Louis Moraines	762.6	St. Louis Moraines
	Tamarack Lowlands	33.6	St. Paul Baldwin Plains
	Toimi Uplands	950.0	Tamarack Lowlands
			Toimi Uplands
			Northern Rich Tamarack Swamp (Water Track)
FPn81		**674.2**	
Laurentian Uplands	Laurentian Uplands	417.2	Laurentian Uplands
	St. Louis Moraines	243.0	St. Louis Moraines
	Toimi Uplands	14.0	Toimi Uplands
			Not listed in Field Guide to NPCs --> FPn82a?
FPn81a		**15884.6**	
	Agassiz Lowlands	15884.6	
			Northern Rich Tamarack Swamp (Western Basin)
FPn82		**1566.1**	
	Chippewa Plains	7.5	Chippewa Plains
	Hardwood Hills	43.6	Hardwood Hills
Laurentian Uplands	Laurentian Uplands	16.7	Laurentian Uplands
	Mille Lacs Uplands	18.0	Mille Lacs Uplands
	Nashwauk Uplands	14.7	Nashwauk Uplands
	North Shore Highlands	375.2	North Shore Highlands
Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	411.8	Pine Moraines & Outwash Plains
	St. Louis Moraines	490.7	St. Louis Moraines
	Tamarack Lowlands	187.9	Tamarack Lowlands
			Rich Tamarack - (Alder) Swamp
FPn82a		**15634.0**	
	Agassiz Lowlands	4965.3	Agassiz Lowlands
	Chippewa Plains	62.4	Chippewa Plains
Laurentian Uplands	Laurentian Uplands	2135.6	Hardwood Hills
	Littlefork-Vermillion Uplands	14.4	Laurentian Uplands
	Nashwauk Uplands	50.8	Littlefork-Vermillion Uplands
	North Shore Highlands	2796.3	Mille Lacs Uplands
	Pine Moraines & Outwash Plains	148.9	Nashwauk Uplands
	St. Louis Moraines	1704.5	North Shore Highlands

	Tamarack Lowlands	2452.1	Pine Moraines & Outwash Plains
	Toimi Uplands	1303.7	St. Louis Moraines
			Tamarack Lowlands
			Toimi Uplands
FPn82b		**8954.0**	**Extremely Rich Tamarack Swamp**
	Agassiz Lowlands	5536.1	Agassiz Lowlands
	Chippewa Plains	213.9	Chippewa Plains
	Hardwood Hills	151.2	Hardwood Hills
	Pine Moraines & Outwash Plains	3000.7	Pine Moraines & Outwash Plains
	St. Louis Moraines	52.1	St. Louis Moraines
FPn63			**Southern Rich Conifer Swamp**
	Mille Lacs Uplands		Mille Lacs Uplands
FPs63a		**3635.5**	**Tamarack Swamp (Southern)**
Anoka Sand Plain	Anoka Sand Plain	484.7	Anoka Sand Plain
Aspen Parklands	Aspen Parklands	42.1	Aspen Parklands
Big Woods	Big Woods	4.0	Big Woods
	Chippewa Plains	912.6	Chippewa Plains
Hardwood Hills	Hardwood Hills	1296.2	Hardwood Hills
	Mille Lacs Uplands	368.6	Mille Lacs Uplands
	Minnesota River Prairie	76.2	Minnesota River Prairie
	Pine Moraines & Outwash Plains	332.9	Pine Moraines & Outwash Plains
	St. Paul-Baldwin Plains	118.1	St. Paul-Baldwin Plains
FPT_CX		**7330.2**	**Forested Peatland / Upland Transition Complex**
	Border Lakes	212.2	Border Lakes
Laurentian Uplands	Laurentian Uplands	6046.0	Laurentian Uplands
	North Shore Highlands	0.2	North Shore Highlands
	Toimi Uplands	1071.3	Toimi Uplands
FPw63		**1759.6**	**Northwestern Rich Conifer Swamp**
	Agassiz Lowlands	989.3	Agassiz Lowlands
	Aspen Parklands	770.3	Aspen Parklands

FPw63a		**1560.8**	**Tamarack - Black Spruce Swamp (Aspen Parkland)**
	Agassiz Lowlands	1006.9	Agassiz Lowlands
Aspen Parklands	Aspen Parklands	553.8	Aspen Parklands
FPw63b		**437.3**	**Tamarack Seepage Swamp (Aspen Parkland)**
Aspen Parklands	Aspen Parklands	437.3	Aspen Parklands
			Hardwood Hills
FW_CX		**1666.3**	**Complex**
	Chippewa Plains	168.9	Chippewa Plains
	Hardwood Hills	1091.0	Hardwood Hills
	Pine Moraines & Outwash Plains	362.2	Pine Moraines & Outwash Plains
	St. Louis Moraines	44.2	St. Louis Moraines
FWMM_CX		**285.8**	**Complex**
	Laurentian Uplands	273.0	Laurentian Uplands
	North Shore Highlands	12.8	North Shore Highlands
JPSW_CX		**347.9**	**Complex**
	North Shore Highlands	347.9	North Shore Highlands
LAXXXX		**148.2**	**Complex**
	St. Paul-Baldwin Plains	148.2	St. Paul-Baldwin Plains
LKi32		**3.7**	**Inland Lake Sand/Gravel/Cobb le Shore**
	Minnesota River Prairie	3.3	Big Woods
	Pine Moraines & Outwash Plains	0.4	Minnesota River Prairie
			Pine Moraines & Outwash Plains
LKi32a		**87.0**	**Sand Beach (Inland Lake)**
	Agassiz Lowlands	79.2	Agassiz Lowlands
	Laurentian Uplands	2.9	Laurentian Uplands
	Nashwauk Uplands	2.6	Nashwauk Uplands
	Pine Moraines & Outwash Plains	2.2	Pine Moraines & Outwash Plains

LKi32b		**6.5**	**Gravel/Cobble Beach (Inland Lake)**
Big Woods	Big Woods	4.6	Big Woods
	Hardwood Hills	0.3	Hardwood Hills
	Toimi Uplands	1.5	Toimi Uplands
LKi43a		**4.9**	**Boulder Shore (Inland Lake)**
	Laurentian Uplands	4.9	Laurentian Uplands
			St. Paul Baldwin Plains
LKi43b		**9.2**	**Bedrock Shore (Inland Lake)**
	Laurentian Uplands	9.2	Laurentian Uplands
LKi54		**13.5**	**Inland Lake Clay/Mud Shore**
	Minnesota River Prairie	13.5	Minnesota River Prairie
LKi54a		**135.9**	**Clay/Mud Shore (Inland Lake)**
		135.9	Hardwood Hills
LKi54b1		**135.9**	**Mud Flat (Inland Lake): Saline Subtype**
	Minnesota River Prairie	135.9	Minnesota River Prairie
LKi54b2		**0.4**	**Mud Flat (Inland Lake): Saline Subtype**
	Big Woods	0.4	Big Woods
			Oak Savanna
LKu32a		**4.8**	**Beachgrass Dune (Lake Superior)**
North Shore Highlands	North Shore Highlands	4.8	North Shore Highlands
LKu32b		**6.4**	**Juniper Dune Shrubland (Lake Superior)**
North Shore Highlands	North Shore Highlands	6.4	North Shore Highlands
LKu32c		**10.1**	**Sand Beach (Lake Superior)**
North Shore Highlands	North Shore Highlands	10.1	North Shore Highlands
LKu32d		**4.3**	**Beach Rige Shrubland (Lake Superior)**
	North Shore Highlands	4.3	North Shore Highlands

LKu32e		**32.8**	**Gravel/Cobble Beach (Lake Superior)**
North Shore Highlands	North Shore Highlands	**32.8**	North Shore Highlands
LKu43		**9.2**	**Lake Superior Rocky Shore**
North Shore Highlands	North Shore Highlands	9.2	North Shore Highlands
LKu43a		**6.3**	**Dry Bedrock Shore (Lake Superior)**
North Shore Highlands	North Shore Highlands	6.3	North Shore Highlands
LKu43b			**Wet Rocky Shore (Lake Superior)**
			North Shore Highlands
LKu43b1		**0.6**	**Wet Rocky Shore (Lake Superior): Cobble Subtype**
	North Shore Highlands	0.6	North Shore Highlands
LKu43b2		**1.3**	**Wet Rocky Shore (Lake Superior): Bedrock Subtype**
North Shore Highlands	North Shore Highlands	1.3	North Shore Highlands
MCT_CX		**94.4**	**Complex**
	Laurentian Uplands	5.2	Laurentian Uplands
	North Shore Highlands	89.2	North Shore Highlands
MF_PDMW_CX		**82.4**	**Complex**
	Laurentian Uplands	82.4	Laurentian Uplands
MFS_CX		**10995.6**	**Complex**
	Aspen Parklands	10995.6	Aspen Parklands
MHc26		**14684.6**	**Central Dry-Mesic Oak-Aspen Forest**
	Anoka Sand Plain	97.2	Anoka Sand Plain
	Chippewa Plains	43.6	Chippewa Plains
	Hardwood Hills	272.5	Hardwood Hills
	Mille Lacs Uplands	10212.6	Mille Lacs Uplands

Pine Moraines & Outwash Pla	Pine Moraines & Outwash Plains	3258.0	Pine Moraines & Outwash Plains
	St. Louis Moraines	800.7	St. Louis Moraines
MHc26a		**7322.8**	**Oak - Aspen - Red Maple Forest**
	Chippewa Plains	556.6	Chippewa Plains
	Hardwood Hills	0.0	Hardwood Hills
	Mille Lacs Uplands	52.3	Mille Lacs Uplands
Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	6509.2	Pine Moraines & Outwash Plains
	St. Louis Moraines	204.7	St. Louis Moraines
MHc26b		**7316.0**	**Red Oak - Sugar Maple - Basswood - (Large-Flowered Trillium) Forest**
	Chippewa Plains	153.1	Chippewa Plains
	Mille Lacs Uplands	2577.0	Mille Lacs Uplands
	Pine Moraines & Outwash Plains	4585.9	Pine Moraines & Outwash Plains
MHc36		**2204.6**	**Central Mesic Hardwood Forest (Eastern)**
	Chippewa Plains	6.1	Chippewa Plains
Hardwood Hills	Hardwood Hills	293.9	Hardwood Hills
	Mille Lacs Uplands	1831.4	Mille Lacs Uplands
	Pine Moraines & Outwash Plains	73.2	Pine Moraines & Outwash Plains
MHc36a		**22159.6**	**Red Oak - Basswood Forest (Noncalcareous Till)**
	Anoka Sand Plain	33.4	Anoka Sand Plain
	Big Woods	883.3	Big Woods
Hardwood Hills	Hardwood Hills	557.1	Hardwood Hills
	Mille Lacs Uplands	20063.6	Mille Lacs Uplands
	Pine Moraines & Outwash Plains	384.3	Pine Moraines & Outwash Plains
	St. Croix Moraine	173.3	St. Croix Moraine
	St. Louis Moraines	1.8	St. Louis Moraines
St. Paul-Baldwin Plains	St. Paul-Baldwin Plains	62.9	St. Paul-Baldwin Plains
MHc36b		**694.3**	**Red Oak - Basswood Forest (Calcareous Till)**
	Hardwood Hills	431.1	Hardwood Hills
	Mille Lacs Uplands	263.3	Mille Lacs Uplands

			Minnesota River Prairie
MHc37		**4223.3**	**Central Mesic Hardwood Forest (Western)**
	Hardwood Hills	3987.3	Hardwood Hills
	Pine Moraines & Outwash Plains	235.9	Pine Moraines & Outwash Plains
MHc37a		**4861.7**	**Aspen - (Sugar Maple - Basswood) Forest**
	Chippewa Plains	10.6	Aspen Parkland
	Hardwood Hills	877.1	Chippewa Plains
	Mille Lacs Uplands	17.7	Hardwood Hills
Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	3956.4	Mille Lacs Uplands
			Pine Moraines & Outwash Plains
MHc37b		**15379.8**	**Sugar Maple - Basswood - (Aspen) Forest**
	Chippewa Plains	32.2	Chippewa Plains
	Hardwood Hills	9397.2	Hardwood Hills
	Mille Lacs Uplands	13.4	Mille Lacs Uplands
Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	5937.1	Pine Moraines & Outwash Plains
MHc38a		**50.0**	**White Pine - Sugar Maple - Basswood Forest (Cold Slope)**
	St. Paul-Baldwin Plains	20.6	Rochester Plateau
The Blufflands	The Blufflands	29.4	St. Paul-Baldwin Plains
			The Blufflands
MHc47		**198.0**	**Central Wet-Mesic Hardwood Forest**
	Mille Lacs Uplands	194.8	Mille Lacs Uplands
	Oak Savanna	3.2	Oak Savanna
MHc47a		**7445.4**	**Basswood - Black Ash Forest**
	Anoka Sand Plain	166.6	Anoka Sand Plain
	Hardwood Hills	32.8	Hardwood Hills
	Mille Lacs Uplands	7047.7	Mille Lacs Uplands
	Pine Moraines & Outwash Plains	61.1	Pine Moraines & Outwash Plains
	St. Croix Moraine	137.3	St. Croix Moraine
MHF_CX		**273.5**	**Complex**

	Hardwood Hills	273.5	Hardwood Hills
MHn35		**6162.9**	**Northern Mesic Hardwood Forest**
	Chippewa Plains	33.4	Chippewa Plains
	Glacial Lake Superior Plain	0.0	Glacial Lake Superior Plain
	Hardwood Hills	426.9	Hardwood Hills
	Mille Lacs Uplands	848.6	Mille Lacs Uplands
	North Shore Highlands	1224.9	North Shore Highlands
	Pine Moraines & Outwash Plains	685.0	Pine Moraines & Outwash Plains
	St. Louis Moraines	2885.8	St. Louis Moraines
	Tamarack Lowlands	58.4	Tamarack Lowlands
MHn35a		**8294.0**	**Aspen - Birch - Basswood Forest**
	Border Lakes	35.9	Border Lakes
	Chippewa Plains	948.1	Chippewa Plains
	Glacial Lake Superior Plain	1714.1	Glacial Lake Superior Plain
	Hardwood Hills	129.9	Hardwood Hills
	Littlefork-Vermillion Uplands	11.2	Littlefork-Vermillion Uplands
	Mille Lacs Uplands	1109.7	Mille Lacs Uplands
	North Shore Highlands	162.1	North Shore Highlands
	Pine Moraines & Outwash Plains	1643.4	Pine Moraines & Outwash Plains
	St. Louis Moraines	2539.6	St. Louis Moraines
MHn35b		**12504.9**	**Red Oak - Sugar Maple - Basswood - (Bluebead Lily) Forest**
	Chippewa Plains	0.7	Chippewa Plains
	Glacial Lake Superior Plain	1975.7	Glacial Lake Superior Plain
	Hardwood Hills	55.1	Hardwood Hills
	Mille Lacs Uplands	1013.2	Mille Lacs Uplands
North Shore Highlands	North Shore Highlands	5566.0	North Shore Highlands
	Pine Moraines & Outwash Plains	701.9	Pine Moraines & Outwash Plains
	St. Louis Moraines	3041.2	St. Louis Moraines
	Tamarack Lowlands	136.0	St. Paul Baldwin Plains
	Toimi Uplands	16.1	Tamarack Lowlands
			Toimi Uplands

MHn44		**6966.3**	**Northern Wet-Mesic Boreal Hardwood-Conifer Forest**
	Agassiz Lowlands	36.7	Agassiz Lowlands
	Aspen Parklands	445.1	Aspen Parklands
	Border Lakes	52.6	Border Lakes
	Chippewa Plains	33.0	Chippewa Plains
	Glacial Lake Superior Plain	1176.8	Glacial Lake Superior Plain
	Hardwood Hills	114.6	Hardwood Hills
Laurentian Uplands	Laurentian Uplands	655.8	Laurentian Uplands
	Littlefork-Vermillion Uplands	1.8	Littlefork-Vermillion Uplands
	Mille Lacs Uplands	191.7	Mille Lacs Uplands
	North Shore Highlands	2959.3	North Shore Highlands
	Pine Moraines & Outwash Plains	106.0	Pine Moraines & Outwash Plains
	St. Louis Moraines	917.8	St. Louis Moraines
	Tamarack Lowlands	44.1	Tamarack Lowlands
	Toimi Uplands	230.1	Toimi Uplands
MHn44a		**4920.8**	**Aspen - Birch - Red Maple Forest**
	Agassiz Lowlands	3.8	Agassiz Lowlands
	Chippewa Plains	267.0	Chippewa Plains
	Glacial Lake Superior Plain	3750.3	Glacial Lake Superior Plain
	Mille Lacs Uplands	65.4	Mille Lacs Uplands
	North Shore Highlands	109.7	North Shore Highlands
	Pine Moraines & Outwash Plains	499.9	Pine Moraines & Outwash Plains
	St. Louis Moraines	19.1	St. Louis Moraines
	Toimi Uplands	205.6	Toimi Uplands
MHn44b		**2077.6**	**White Pine - White Spruce - Paper Birch Forest**
	Glacial Lake Superior Plain	1684.1	Glacial Lake Superior Plain
	Mille Lacs Uplands	311.8	Mille Lacs Uplands
North Shore Highlands	North Shore Highlands	52.1	North Shore Highlands
	St. Louis Moraines	23.3	St. Louis Moraines
	Tamarack Lowlands	6.2	Tamarack Lowlands
MHn44c		**20830.1**	**Aspen - Fir Forest**
	Agassiz Lowlands	15970.1	Agassiz Lowlands

	Glacial Lake Superior Plain	4106.7	Glacial Lake Superior Plain
	North Shore Highlands	711.6	North Shore Highlands
	St. Louis Moraines	13.0	St. Louis Moraines
	Tamarack Lowlands	2.7	Tamarack Lowlands
	Toimi Uplands	25.9	Toimi Uplands
MHn44d		**1037.4**	**Aspen - Birch - Fir Forest**
	Hardwood Hills	82.2	Hardwood Hills
	Pine Moraines & Outwash Plains	955.1	Pine Moraines & Outwash Plains
MHn45		**3117.2**	**Northern Mesic Hardwood (Cedar) Forest**
	Laurentian Uplands	68.7	Laurentian Uplands
North Shore Highlands	North Shore Highlands	489.5	North Shore Highlands
	Tamarack Lowlands	196.5	Tamarack Lowlands
	Toimi Uplands	2362.2	Toimi Uplands
MHn45a		**11944.4**	**Paper Birch - Sugar Maple Forest (North Shore)**
	Border Lakes	77.2	Border Lakes
	Laurentian Uplands	160.8	Laurentian Uplands
North Shore Highlands	North Shore Highlands	11005.4	North Shore Highlands
	Tamarack Lowlands	135.9	Tamarack Lowlands
	Toimi Uplands	564.9	Toimi Uplands
MHn45b		**5986.1**	**White Cedar - Yellow Birch Forest**
	Laurentian Uplands	1623.7	Laurentian Uplands
North Shore Highlands	North Shore Highlands	3522.9	North Shore Highlands
	Toimi Uplands	839.5	Toimi Uplands
MHn45c		**38903.0**	**Sugar Maple Forest (North Shore)**
Border Lakes	Border Lakes	482.2	Border Lakes
	Laurentian Uplands	74.8	Laurentian Uplands
North Shore Highlands	North Shore Highlands	38036.1	North Shore Highlands
	Toimi Uplands	310.0	Toimi Uplands
MHn46		**1605.5**	**Northern Wet-Mesic Hardwood Forest**
	Chippewa Plains	442.9	Chippewa Plains

	Glacial Lake Superior Plain	118.1	Glacial Lake Superior Plain
	Hardwood Hills	23.3	Hardwood Hills
	Mille Lacs Uplands	109.7	Mille Lacs Uplands
	North Shore Highlands	566.6	North Shore Highlands
	Pine Moraines & Outwash Plains	96.3	Pine Moraines & Outwash Plains
	St. Louis Moraines	92.9	St. Louis Moraines
	Tamarack Lowlands	129.4	Tamarack Lowlands
	Toimi Uplands	26.4	Toimi Uplands
MHn46a		**5510.2**	**Aspen - Ash Forest**
	Agassiz Lowlands	85.8	Agassiz Lowlands
	Glacial Lake Superior Plain	1689.4	Glacial Lake Superior Plain
	Mille Lacs Uplands	2606.1	Hardwood Hills
	North Shore Highlands	92.5	Mille Lacs Uplands
	St. Louis Moraines	152.3	North Shore Highlands
	Tamarack Lowlands	884.0	St. Louis Moraines
			Tamarack Lowlands
MHn46b		**2508.7**	**Black Ash - Basswood Forest**
	Agassiz Lowlands	99.8	Agassiz Lowlands
	Glacial Lake Superior Plain	1863.1	Glacial Lake Superior Plain
	Mille Lacs Uplands	316.3	Mille Lacs Uplands
	North Shore Highlands	140.6	North Shore Highlands
	St. Louis Moraines	29.8	St. Louis Moraines
	Toimi Uplands	59.1	Toimi Uplands
MHn47		**1.1**	**Northern Rich Mesic Hardwood Forest**
	Mille Lacs Uplands	1.1	Mille Lacs Uplands
MHn47a		**6713.1**	**Sugar Maple - Basswood - (Bluebead Lily) Forest**
	Glacial Lake Superior Plain	290.0	Glacial Lake Superior Plain
	Mille Lacs Uplands	375.4	Mille Lacs Uplands
North Shore Highlands	North Shore Highlands	4244.4	North Shore Highlands
	St. Louis Moraines	162.1	St. Louis Moraines
	Toimi Uplands	1641.2	Toimi Uplands

			Sugar Maple - Basswood - (Horsetail) Forest
MHn47b		**270.9**	
	Mille Lacs Uplands	4.0	Mille Lacs Uplands
	Tamarack Lowlands	266.8	Tamarack Lowlands
MHn55a		**27.2**	**Not listed in Field Guide to NPCs -->?**
	Agassiz Lowlands	27.2	Agassiz Lowlands
MHS_CX		**3.2**	**Complex**
	Coteau Moraines	3.2	Coteau Moraines
MHs37		**3279.5**	**Southern Dry-Mesic Oak Forest**
	Anoka Sand Plain	0.0	Anoka Sand Plain
Big Woods	Big Woods	38.1	Big Woods
Oak Savanna	Oak Savanna	394.0	Mille Lacs Uplands
	Rochester Plateau	315.1	Minnesota River Prairie
	The Blufflands	2532.3	Oak Savanna
			Rochester Plateau
			The Blufflands
MHs37a		**4161.7**	**Red Oak - White Oak Forest**
	Anoka Sand Plain	0.4	Anoka Sand Plain
Oak Savanna	Oak Savanna	77.2	Big Woods
	Rochester Plateau	244.7	Oak Savanna
St. Paul-Baldwin Plains	St. Paul-Baldwin Plains	75.9	Rochester Plateau
The Blufflands	The Blufflands	3763.5	St. Paul-Baldwin Plains
			The Blufflands
			Red Oak - White Oak - (Sugar Maple) Forest
MHs37b		**12669.4**	
	Anoka Sand Plain	126.3	Anoka Sand Plain
	Big Woods	11.0	Big Woods
	Hardwood Hills	2.2	Hardwood Hills
Mille Lacs Uplands	Mille Lacs Uplands	10.3	Mille Lacs Uplands
	Oak Savanna	6.9	Oak Savanna
	Rochester Plateau	939.9	Rochester Plateau
	St. Paul-Baldwin Plains	190.9	St. Paul-Baldwin Plains

The Blufflands	The Blufflands	11381.9	The Blufflands
MHs38		**1135.8**	**Southern Mesic Oak-Basswood Forest**
	Big Woods	14.7	Big Woods
Coteau Moraines	Coteau Moraines	114.8	Coteau Moraines
	Hardwood Hills	452.7	Hardwood Hills
	Minnesota River Prairie	93.6	Mille Lacs Uplands
	Oak Savanna	411.3	Minnesota River Prairie
Rochester Plateau	Rochester Plateau	1.0	Oak Savanna
The Blufflands	The Blufflands	47.7	Red River Prairie
			Rochester Plateau
St. Paul-Baldwin Plains	St. Paul-Baldwin Plains		St. Paul-Baldwin Plains
			The Blufflands
MHs38a		**775.9**	**White Pine - Oak - Sugar Maple Forest**
	Mille Lacs Uplands	22.1	Mille Lacs Uplands
Rochester Plateau	Rochester Plateau	32.4	Rochester Plateau
	St. Paul-Baldwin Plains	9.6	St. Paul-Baldwin Plains
The Blufflands	The Blufflands	711.8	The Blufflands
MHs38b		**4821.9**	**Basswood - Bur Oak - (Green Ash) Forest**
	Big Woods	103.4	Aspen Parkland
	Coteau Moraines	746.6	Big Woods
	Hardwood Hills	106.1	Coteau Moraines
	Inner Coteau	104.0	Hardwood Hills
Minnesota River Prairie	Minnesota River Prairie	3564.3	Inner Coteau
	Oak Savanna	60.7	Minnesota River Prairie
	Red River Prairie	14.5	Oak Savanna
	St. Paul-Baldwin Plains	122.3	Red River Prairie
			St. Paul-Baldwin Plains
MHs38c		**4131.9**	**Red Oak - Sugar Maple - Basswood - (Bitternut Hickory) Forest**
	Anoka Sand Plain	39.8	Anoka Sand Plain
Big Woods	Big Woods	515.9	Big Woods
	Hardwood Hills	3.2	Hardwood Hills
Mille Lacs Uplands	Mille Lacs Uplands	28.6	Mille Lacs Uplands

	Minnesota River Prairie	234.8	Minnesota River Prairie
	Oak Savanna	669.0	Oak Savanna
Rochester Plateau	Rochester Plateau	156.0	Rochester Plateau
	St. Paul-Baldwin Plains	165.0	St. Paul-Baldwin Plains
The Blufflands	The Blufflands	2319.6	The Blufflands
MHs39		**1340.3**	**Southern Mesic Maple-Basswood Forest**
	Big Woods	66.0	Big Woods
	Coteau Moraines	132.3	Coteau Moraines
	Hardwood Hills	99.2	Hardwood Hills
	Minnesota River Prairie	19.5	Minnesota River Prairie
	Oak Savanna	589.9	Oak Savanna
Rochester Plateau	Rochester Plateau	53.2	Rochester Plateau
	The Blufflands	380.2	The Blufflands
MHs39a		**1492.1**	**Sugar Maple - Basswood - (Bitternut Hickory) Forest**
	Anoka Sand Plain	8.0	Anoka Sand Plain
	Big Woods	339.6	Big Woods
Minnesota River Prairie	Minnesota River Prairie	13.9	Minnesota River Prairie
Oak Savanna	Oak Savanna	636.2	Oak Savanna
	Rochester Plateau	109.3	Rochester Plateau
St. Paul-Baldwin Plains	St. Paul-Baldwin Plains	33.3	St. Paul-Baldwin Plains
The Blufflands	The Blufflands	351.7	The Blufflands
MHs39b		**3195.1**	**Sugar Maple - Basswood - Red Oak - (Blue Beech) Forest**
	Rochester Plateau	174.0	Hardwood Hills
The Blufflands	The Blufflands	3021.1	Rochester Plateau
			The Blufflands
MHs39c		**1015.0**	**Sugar Maple Forest (Big Woods)**
	Anoka Sand Plain	3.2	Anoka Sand Plain
Big Woods	Big Woods	812.1	Big Woods
Hardwood Hills	Hardwood Hills	2.9	Hardwood Hills
	Minnesota River Prairie	107.8	Mille Lacs Uplands
Oak Savanna	Oak Savanna	89.0	Minnesota River Prairie

			Oak Savanna
MHs49		**1509.1**	**Southern Wet-Mesic Hardwood Forest**
Coteau Moraines	Coteau Moraines	746.3	Big Woods
	Minnesota River Prairie	108.5	Coteau Moraines
	Oak Savanna	115.5	Mille Lacs Uplands
	Rochester Plateau	4.0	Minnesota River Prairie
The Blufflands	The Blufflands	534.8	Oak Savanna
			Rochester Plateau
			The Blufflands
MHs49a		**835.1**	**Elm - Basswood - Black Ash - (Hackberry) Forest**
Big Woods	Big Woods	219.7	Big Woods
	Coteau Moraines	35.1	Coteau Moraines
Hardwood Hills	Hardwood Hills	2.7	Hardwood Hills
	Minnesota River Prairie	232.0	Inner Coteau
	Oak Savanna	94.7	Minnesota River Prairie
Rochester Plateau	Rochester Plateau	13.1	Oak Savanna
	The Blufflands	237.9	Rochester Plateau
			The Blufflands
MHs49b		**946.6**	**Elm - Basswood - Black Ash - (Blue Beech) Forest**
	Rochester Plateau	2.1	Rochester Plateau
	The Blufflands	944.5	The Blufflands
MHw36a		**1102.6**	**Green Ash - Bur Oak - Elm Forest**
	Aspen Parklands	800.9	Aspen Parklands
Red River Prairie	Red River Prairie	301.6	Red River Prairie
MMS_CX		**5309.1**	**Meadow - Marsh - Fen - Swamp Complex**
	Anoka Sand Plain	4.2	Anoka Sand Plain
	Aspen Parklands	81.7	Aspen Parklands
	Big Woods	413.3	Big Woods
	Coteau Moraines	65.8	Coteau Moraines
	Hardwood Hills	1502.5	Hardwood Hills

	Laurentian Uplands	148.5	Laurentian Uplands
	Mille Lacs Uplands	571.7	Mille Lacs Uplands
	Minnesota River Prairie	679.5	Minnesota River Prairie
	North Shore Highlands	57.0	North Shore Highlands
Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	360.6	Pine Moraines & Outwash Plains
	Red River Prairie	1424.5	Red River Prairie
MMWF_CX		**321.0**	**Complex**
	Border Lakes	1.6	Border Lakes
	Laurentian Uplands	319.4	Laurentian Uplands
MOW_CX		**93.0**	**Marsh-Open Water Complex**
	Hardwood Hills	14.6	Hardwood Hills
Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	78.4	Pine Moraines & Outwash Plains
MPCEXX			**Mesic Prairie (Central)**
			Minnesota River Prairie
MPSXWXX			**Mesic Prairie (Southwest)**
			Minnesota River Prairie
MRn83		**5690.1**	**Northern Mixed Cattail Marsh**
	Agassiz Lowlands	214.5	Agassiz Lowlands
	Anoka Sand Plain	709.9	Anoka Sand Plain
	Aspen Parklands	1846.7	Aspen Parklands
Big Woods	Big Woods	511.0	Big Woods
	Border Lakes	4.5	Border Lakes
	Chippewa Plains	18.0	Chippewa Plains
	Hardwood Hills	95.8	Hardwood Hills
Laurentian Uplands	Laurentian Uplands	1.8	Laurentian Uplands
	Mille Lacs Uplands	816.2	Mille Lacs Uplands
	Oak Savanna	173.4	Oak Savanna
	Pine Moraines & Outwash Plains	72.5	Pine Moraines & Outwash Plains
Red River Prairie	Red River Prairie	1071.8	Red River Prairie
	St. Louis Moraines	36.1	St. Louis Moraines
	St. Paul-Baldwin Plains	77.5	St. Paul-Baldwin Plains
	Tamarack Lowlands	24.0	Tamarack Lowlands

	Toimi Uplands	16.4	The Blufflands
			Toimi Uplands
MRn83a		**2003.8**	**Cattail - Sedge Marsh (Northern)**
	Agassiz Lowlands	954.6	Agassiz Lowlands
	Anoka Sand Plain	2.6	Anoka Sand Plain
	Big Woods	509.3	Big Woods
	Hardwood Hills	22.6	Hardwood Hills
	Laurentian Uplands	10.7	Laurentian Uplands
	Mille Lacs Uplands	71.4	Mille Lacs Uplands
Minnesota River Prairie	Minnesota River Prairie	0.2	Minnesota River Prairie
	Nashwauk Uplands	0.5	Nashwauk Uplands
	North Shore Highlands	101.1	North Shore Highlands
	Pine Moraines & Outwash Plains	14.4	Pine Moraines & Outwash Plains
Red River Prairie	Red River Prairie	0.6	Red River Prairie
	St. Louis Moraines	17.6	St. Louis Moraines
	St. Paul-Baldwin Plains	114.5	St. Paul-Baldwin Plains
	The Blufflands	158.5	The Blufflands
	Toimi Uplands	25.3	Toimi Uplands
MRn83b		**909.4**	**Cattail Marsh (Northern)**
	Agassiz Lowlands	41.3	Agassiz Lowlands
	Aspen Parklands	7.0	Aspen Parklands
	Chippewa Plains	0.4	Chippewa Plains
	Hardwood Hills	484.2	Hardwood Hills
	Laurentian Uplands	1.4	Laurentian Uplands
	Minnesota River Prairie	70.9	Minnesota River Prairie
	Oak Savanna	24.6	Oak Savanna
	Pine Moraines & Outwash Plains	160.5	Pine Moraines & Outwash Plains
	Red River Prairie	119.1	Red River Prairie
			The Blufflands
MRn84		**0.5**	**Northern Mixed Cattail Marsh**
	Big Woods	0.5	Big Woods
			St. Paul Baldwin Plains
MRn93		**6172.2**	**Northern Bulrush-Spikerush Marsh**

Anoka Sand Plain	Anoka Sand Plain	189.3	Anoka Sand Plain
	Aspen Parklands	830.7	Aspen Parklands
	Big Woods	82.8	Big Woods
	Mille Lacs Uplands	257.0	Mille Lacs Uplands
	Oak Savanna	8.6	Oak Savanna
	Red River Prairie	397.7	Red River Prairie
St. Paul-Baldwin Plains	St. Paul-Baldwin Plains	195.6	Rochester Plateau
The Blufflands	The Blufflands	4210.5	St. Paul-Baldwin Plains
			The Blufflands
MRn93a		**2889.7**	**Bulrush Marsh (Northern)**
	Anoka Sand Plain	9.2	Anoka Sand Plain
Big Woods	Big Woods	1211.1	Big Woods
	Laurentian Uplands	1.3	Hardwood Hills
	Minnesota River Prairie	1.1	Laurentian Uplands
	St. Paul-Baldwin Plains	944.0	Minnesota River Prairie
The Blufflands	The Blufflands	722.9	Red River Prairie
			St. Paul-Baldwin Plains
			The Blufflands
MRn93b		**1509.0**	**Spikerush - Bur Reed Marsh (Northern)**
	Agassiz Lowlands	76.9	Agassiz Lowlands
	Anoka Sand Plain	24.5	Anoka Sand Plain
Big Woods	Big Woods	46.7	Big Woods
	Chippewa Plains	29.2	Chippewa Plains
	Hardwood Hills	0.0	Hardwood Hills
	North Shore Highlands	5.3	North Shore Highlands
	Oak Savanna	0.2	Oak Savanna
	Pine Moraines & Outwash Plains	812.8	Pine Moraines & Outwash Plains
	St. Paul-Baldwin Plains	19.8	St. Paul-Baldwin Plains
The Blufflands	The Blufflands	493.7	The Blufflands
MRp83		**3036.2**	**Prairie Mixed Cattail Marsh**
	Coteau Moraines	2057.9	Coteau Moraines
	Hardwood Hills	18.5	Hardwood Hills
	Inner Coteau	10.3	Inner Coteau
	Minnesota River Prairie	239.0	Minnesota River Prairie

Red River Prairie	Red River Prairie	710.5	Red River Prairie
MRp83a		**3000.8**	**Cattail - Sedge Marsh (Prairie)**
Aspen Parklands	Aspen Parklands	769.8	Aspen Parklands
	Big Woods	411.2	Big Woods
Coteau Moraines	Coteau Moraines	402.3	Coteau Moraines
	Hardwood Hills	65.6	Hardwood Hills
	Inner Coteau	57.6	Inner Coteau
	Minnesota River Prairie	497.2	Minnesota River Prairie
Red River Prairie	Red River Prairie	797.2	Red River Prairie
MRp83b		**1226.3**	**Cattail Marsh (Prairie)**
	Coteau Moraines	86.8	Big Woods
	Hardwood Hills	123.4	Coteau Moraines
	Minnesota River Prairie	1016.0	Hardwood Hills
			Minnesota River Prairie
MRp93		**458.9**	**Prairie Bulrush- Arrowhead Marsh**
	Aspen Parklands	422.9	Aspen Parklands
	Coteau Moraines	13.9	Coteau Moraines
	Minnesota River Prairie	22.0	Minnesota River Prairie
MRp93a		**225.1**	**Bulrush Marsh (Prairie)**
Aspen Parklands	Aspen Parklands	109.7	Aspen Parklands
	Coteau Moraines	68.0	Coteau Moraines
	Inner Coteau	14.7	Inner Coteau
Minnesota River Prairie	Minnesota River Prairie	16.6	Minnesota River Prairie
	Oak Savanna	16.2	Oak Savanna
MRp93b		**35.9**	**Spikerush - Bur Reed Marsh (Prairie)**
	Coteau Moraines	18.1	Coteau Moraines
	Inner Coteau	10.0	Inner Coteau
Minnesota River Prairie	Minnesota River Prairie	7.8	Minnesota River Prairie
MRp93c		**32.0**	**Arrowhead Marsh (Prairie)**
	Minnesota River Prairie	32.0	Minnesota River Prairie
			Oak Savanna

MRu94		**4.4**	**Lake Superior Coastal Marsh**
	North Shore Highlands	4.4	North Shore Highlands
MRu94a		**13.7**	**Estuary Marsh (Lake Superior)**
	Glacial Lake Superior Plain	8.3	Glacial Lake Superior Plain
	North Shore Highlands	5.4	North Shore Highlands
MSA_CX		**5716.8**	**Complex**
	Agassiz Lowlands	404.2	Agassiz Lowlands
	Aspen Parklands	5203.1	Aspen Parklands
	Big Woods	0.0	Big Woods
	Minnesota River Prairie	109.5	Minnesota River Prairie
MSM_CX		**93.1**	**Meadow - Shrub Swamp - Marsh - Wet-Mesic Hardwood Complex**
	Pine Moraines & Outwash Plains	93.1	Pine Moraines & Outwash Plains
NPF_CX		**885.9**	**Complex**
	Border Lakes	11.8	Border Lakes
	Laurentian Uplands	733.4	Laurentian Uplands
	North Shore Highlands	140.7	North Shore Highlands
NT_CX		**24.4**	**Complex**
	North Shore Highlands	24.4	North Shore Highlands
NWF_CX		**114.7**	**Complex**
	Red River Prairie	114.7	Red River Prairie
OABWME		**0.8**	**Oak Forest (Big Woods) Mesic Subtype**
	Big Woods	0.0	Big Woods
	Oak Savanna	0.7	Oak Savanna
OPn81		**1244.7**	**by**
	Border Lakes	12.6	Border Lakes
	Chippewa Plains	0.8	Chippewa Plains
	Hardwood Hills	16.3	Hardwood Hills

	Laurentian Uplands	390.3	Laurentian Uplands
	Mille Lacs Uplands	38.4	Mille Lacs Uplands
	North Shore Highlands	152.5	North Shore Highlands
	Pine Moraines & Outwash Plains	11.6	Pine Moraines & Outwash Plains
	St. Louis Moraines	483.4	St. Louis Moraines
	Toimi Uplands	138.7	Toimi Uplands
OPn81a		**3630.7**	**Bog Birch - Alder Shore Fen**
	Border Lakes	43.8	Border Lakes
	Hardwood Hills	564.8	Hardwood Hills
	Laurentian Uplands	448.2	Laurentian Uplands
	Mille Lacs Uplands	161.1	Mille Lacs Uplands
	North Shore Highlands	78.1	North Shore Highlands
	Pine Moraines & Outwash Plains	2324.2	Pine Moraines & Outwash Plains
	Toimi Uplands	10.5	Toimi Uplands
OPn81b		**470.9**	**Leatherleaf - Sweet Gale Shore Fen**
	Border Lakes	14.7	Border Lakes
	Laurentian Uplands	150.4	Laurentian Uplands
	Mille Lacs Uplands	21.3	Mille Lacs Uplands
	North Shore Highlands	114.6	North Shore Highlands
	Toimi Uplands	169.9	St. Paul Baldwin Plains
			Toimi Uplands
OPn91		**58.7**	**Northern Rich Fen (Water Track)**
	Hardwood Hills	28.0	Aspen Parklands
	Laurentian Uplands	16.7	Hardwood Hills
	St. Louis Moraines	12.5	Laurentian Uplands
	Toimi Uplands	0.7	St. Louis Moraines
			Toimi Uplands
OPn91a		**4313.2**	**Shrub Rich Fen (Water Track)**
	Agassiz Lowlands	4086.6	Agassiz Lowlands
Laurentian Uplands	Laurentian Uplands	148.1	Hardwood Hills
	North Shore Highlands	5.9	Laurentian Uplands
	St. Louis Moraines	67.6	North Shore Highlands
	Toimi Uplands	4.9	St. Louis Moraines

			Toimi Uplands
OPn91b		**355.6**	**Graminoid Rich Fen (Water Track)**
	Agassiz Lowlands	187.5	Agassiz Lowlands
Laurentian Uplands	Laurentian Uplands	81.4	Laurentian Uplands
	North Shore Highlands	3.6	North Shore Highlands
	St. Louis Moraines	83.1	St. Louis Moraines
OPn91b1		**5475.0**	**Graminoid Rich Fen (Water Track): Featureless Water**
	Agassiz Lowlands	5470.6	Agassiz Lowlands
Laurentian Uplands	Laurentian Uplands	4.4	Laurentian Uplands
			Pine Moraine & Outwash Plains
OPn91b2		**1550.3**	**Graminoid Rich Fen (Water Track): Flark Subtype**
	Agassiz Lowlands	1446.4	Agassiz Lowlands
Laurentian Uplands	Laurentian Uplands	159.9	Laurentian Uplands
	North Shore Highlands	57.1	North Shore Highlands
OPn92		**1593.9**	**Northern Rich Fen (Basin)**
	Agassiz Lowlands	136.5	Agassiz Lowlands
Anoka Sand Plain	Anoka Sand Plain	60.3	Anoka Sand Plain
	Aspen Parklands	3.5	Aspen Parklands
	Big Woods	4.5	Big Woods
	Border Lakes	3.6	Border Lakes
	Hardwood Hills	34.4	Hardwood Hills
	Laurentian Uplands	119.8	Laurentian Uplands
	Mille Lacs Uplands	213.1	Mille Lacs Uplands
	Minnesota River Prairie	225.4	Minnesota River Prairie
	North Shore Highlands	127.2	North Shore Highlands
	Pine Moraines & Outwash Plains	658.3	Oak Savanna
	Toimi Uplands	7.3	Pine Moraines & Outwash Plains
			Toimi Uplands
OPn92a		**10605.7**	**Graminoid Rich Fen (Basin)**
	Agassiz Lowlands	8749.7	Agassiz Lowlands

	Aspen Parklands	95.7	Aspen Parklands
	Big Woods	10.9	Big Woods
	Border Lakes	14.3	Border Lakes
	Chippewa Plains	33.1	Chippewa Plains
	Hardwood Hills	187.5	Hardwood Hills
	Laurentian Uplands	151.7	Laurentian Uplands
	Mille Lacs Uplands	118.2	Mille Lacs Uplands
	Minnesota River Prairie	1.7	Minnesota River Prairie
	North Shore Highlands	143.1	North Shore Highlands
	Pine Moraines & Outwash Plains	697.9	Pine Moraines & Outwash Plains
	St. Louis Moraines	171.6	St. Louis Moraines
	St. Paul-Baldwin Plains	2.4	St. Paul-Baldwin Plains
	Tamarack Lowlands	92.4	Tamarack Lowlands
	Toimi Uplands	135.6	Toimi Uplands
OPn92b		**6012.7**	**Graminoid - Sphagnum Rich Fen (Basin)**
	Agassiz Lowlands	4330.1	Agassiz Lowlands
Anoka Sand Plain	Anoka Sand Plain	35.9	Anoka Sand Plain
	Border Lakes	7.1	Big Woods
	Chippewa Plains	63.9	Border Lakes
	Hardwood Hills	414.3	Chippewa Plains
	Laurentian Uplands	110.9	Hardwood Hills
	Minnesota River Prairie	23.1	Laurentian Uplands
	Pine Moraines & Outwash Plains	964.0	Mille Lacs Uplands
	Toimi Uplands	63.2	Minnesota River Prairie
			Pine Moraines & Outwash Plains
			Toimi Uplands
			Not listed in Field Guide to NPCs --> OPn92b?
OPn921b1		**5.6**	
	Agassiz Lowlands	5.6	Agassiz Lowlands
OPn93		**5.0**	**Northern Rich Fen (Basin)**
	Anoka Sand Plain	5.0	Anoka Sand Plain
			St. Paul Baldwin Plains
OPn93a		**6.7**	**Spring Fen**

	Hardwood Hills	5.7	Hardwood Hills
	Pine Moraines & Outwash Plains	1.1	Pine Moraines & Outwash Plains
OPp91		**11095.0**	**Prairie Rich Fen**
	Agassiz Lowlands	233.4	Agassiz Lowlands
	Anoka Sand Plain	10.0	Anoka Sand Plain
	Aspen Parklands	10569.7	Aspen Parklands
	Hardwood Hills	2.1	Hardwood Hills
	Red River Prairie	279.7	Mille Lacs Uplands
			Red River Prairie
OPp91a		**877.1**	**Rich Fen (Mineral Soil)**
	Aspen Parklands	782.0	Aspen Parklands
	Hardwood Hills	17.4	Hardwood Hills
	Minnesota River Prairie	77.7	Minnesota River Prairie
			Red River Prairie
OPp91b		**6830.5**	**Rich Fen**
Aspen Parklands	Aspen Parklands	6808.0	Aspen Parklands
Pine Moraines & Outwash Pla	Pine Moraines & Outwash Plains	22.4	Pine Moraines & Outwash Plains
	Red River Prairie	0.1	Red River Prairie
OPp91c		**968.8**	**Rich Fen (Prairie Seepage)**
Aspen Parklands	Aspen Parklands	717.3	Aspen Parklands
	Hardwood Hills	120.1	Hardwood Hills
	Red River Prairie	131.4	Red River Prairie
OPp93		**46.7**	**Prairie Extremely Rich Fen**
	Aspen Parklands	40.1	Aspen Parklands
	Minnesota River Prairie	6.6	Hardwood Hills
			Minnesota River Prairie
OPp93a		**673.8**	**Calcareous Fen (Northwestern)**
Aspen Parklands	Aspen Parklands	128.4	Aspen Parklands
	Red River Prairie	545.4	Hardwood Hills
			Red River Prairie

OPp93b		**67.4**	**Calcareous Fen (Southwestern)**
Coteau Moraines	Coteau Moraines	29.1	Coteau Moraines
	Inner Coteau	5.1	Inner Coteau
	Minnesota River Prairie	33.2	Minnesota River Prairie
OPp93c		**352.3**	**Calcareous Fen (Southeastern)**
Big Woods	Big Woods	127.0	Big Woods
	Oak Savanna	19.0	Hardwood Hills
	Rochester Plateau	2.7	Minnesota River Prairie
	St. Paul-Baldwin Plains	196.9	Oak Savanna
	The Blufflands	6.7	Rochester Plateau
			St. Paul-Baldwin Plains
			The Blufflands
OSW_CX		**470.2**	**Crystalline Bedrock Outcrop (Northern) / Bedrock**
	Border Lakes	1.0	Border Lakes
	North Shore Highlands	469.3	North Shore Highlands
PBW_CX		**3903.7**	**Parkland Brush Prairie - Wetland Complex**
	Aspen Parklands	3903.7	Aspen Parklands
PMA_CX		**197.8**	**Wet-Mesic Prairie / Lowland Aspen Complex**
	Aspen Parklands	197.8	Aspen Parklands
PWL_CX		**11091.4**	**Prairie Wetland Complex**
	Aspen Parklands	388.2	Aspen Parklands
	Coteau Moraines	968.5	Coteau Moraines
	Hardwood Hills	100.0	Hardwood Hills
	Inner Coteau	160.7	Inner Coteau
Minnesota River Prairie	Minnesota River Prairie	1047.9	Minnesota River Prairie
Red River Prairie	Red River Prairie	8426.2	Red River Prairie
RIP_CX		**149.4**	**Complex**
	Aspen Parklands	110.5	Aspen Parklands
	Minnesota River Prairie	38.9	Minnesota River Prairie

ROCW_CX		**343.4**	**Thomson Outcrop / Cliff / Woodland Complex**
	Glacial Lake Superior Plain	8.2	Glacial Lake Superior Plain
	Mille Lacs Uplands	335.2	Mille Lacs Uplands
ROn12b		**187.3**	**Crystalline Bedrock Outcrop (Northern)**
	Agassiz Lowlands	25.1	Agassiz Lowlands
	Glacial Lake Superior Plain	10.6	Glacial Lake Superior Plain
	Laurentian Uplands	2.7	Laurentian Uplands
	North Shore Highlands	148.8	North Shore Highlands
ROn23		**10.8**	**Northern Bedrock Shrubland**
	North Shore Highlands	10.8	North Shore Highlands
ROn23a		**387.1**	**Bedrock Shrubland (Inland)**
	Agassiz Lowlands	2.4	Agassiz Lowlands
	Border Lakes	0.4	Border Lakes
	Glacial Lake Superior Plain	5.5	Glacial Lake Superior Plain
	Laurentian Uplands	25.8	Laurentian Uplands
	North Shore Highlands	352.9	North Shore Highlands
ROn23b		**38.4**	**Bedrock Shrubland (Lake Superior)**
	North Shore Highlands	38.4	North Shore Highlands
ROP_CX		**499.0**	**Rock Outcrop - Dry Prairie Complex**
Minnesota River Prairie	Minnesota River Prairie	499.0	Minnesota River Prairie
ROs12a1		**432.3**	**Crystalline Bedrock Outcrop (Prairie): Minnesota River Subtype**
	Big Woods	9.6	Big Woods
Minnesota River Prairie	Minnesota River Prairie	422.8	Minnesota River Prairie
ROs12a2		**418.9**	**Crystalline Bedrock Outcrop (Prairie): Sioux Quartzite Subtype**
	Inner Coteau	350.8	Inner Coteau
Minnesota River Prairie	Minnesota River Prairie	74.0	Minnesota River Prairie

ROs12b		**69.3**	**Crystalline Bedrock Outcrop (Transition)**
Anoka Sand Plain	Anoka Sand Plain	53.7	Anoka Sand Plain
	Hardwood Hills	0.6	Glacial Lake Superior Plain
	St. Croix Moraine	15.1	Hardwood Hills
			St. Croix Moraine
RRS_CX		**48.2**	**River / Rocky Shore Complex**
	Glacial Lake Superior Plain	28.2	Glacial Lake Superior Plain
	Mille Lacs Uplands	20.0	Mille Lacs Uplands
RRV_CX		**27.8**	**Sand / Gravel / Cobble / Bedrock / Boulder Shore (River) Complex**
	North Shore Highlands	27.8	North Shore Highlands
RSO_CX		**177.7**	**Lake Superior Rocky Shore / Bedrock Shrubland / Bedrock Outcrop Complex**
	Border Lakes	0.7	Border Lakes
	North Shore Highlands	177.0	North Shore Highlands
RVx32		**74.1**	**Sand/Gravel/Cobble River Shore**
	Agassiz Lowlands	3.2	Agassiz Lowlands
	Aspen Parklands	55.6	Aspen Parklands
	Chippewa Plains	10.6	Chippewa Plains
	The Blufflands	4.7	The Blufflands
RVx32a		**45.4**	**Willow Sandbar Shrubland (River)**
	Anoka Sand Plain	41.1	Anoka Sand Plain
	Mille Lacs Uplands	3.3	Glacial Lake Superior Plain
	The Blufflands	1.0	Mille Lacs Uplands
			St. Paul Baldwin Plain
			The Blufflands
RVx32b		**103.6**	**Sand Beach/Sandbar (River)**
	St. Paul-Baldwin Plains	6.3	St. Paul-Baldwin Plains
	The Blufflands	97.3	The Blufflands

RVx32b2		**0.5**	**Sand Beach/Sandbar (River): Permanent Stream Subtype**
	North Shore Highlands	0.3	North Shore Highlands
	St. Paul-Baldwin Plains	0.1	St. Paul-Baldwin Plains
The Blufflands	The Blufflands	6.6	The Blufflands
RVx32c		**0.4**	**Gravel/Cobble Beach (River)**
	Laurentian Uplands	0.4	Laurentian Uplands
			North Shore Highlands
RVx32c2		**193.8**	**Gravel/Cobble Beach (River): Permanent Stream Subtype**
	Border Lakes	11.8	Border Lakes
	Mille Lacs Uplands	2.1	Glacial Lake Superior Plain
	North Shore Highlands	170.2	Mille Lacs Uplands
	The Blufflands	2.8	North Shore Highlands
	Toimi Uplands	6.8	Rochester Plateau
			The Blufflands
			Toimi Uplands
RVx43a		**1.0**	**Bedrock/Boulder Shore (River)**
	North Shore Highlands	1.0	North Shore Highlands
RVx43a1		**17.7**	**Bedrock/Boulder Shore (River): Intermittent Streambed Subtype**
	Border Lakes	4.6	Border Lakes
	Laurentian Uplands	3.9	Laurentian Uplands
	North Shore Highlands	9.1	North Shore Highlands
RVx43a2		**11.3**	**Bedrock/Boulder Shore (River): Permanent Stream Subtype**
	Glacial Lake Superior Plain	3.3	Glacial Lake Superior Plain
	Mille Lacs Uplands	3.3	Mille Lacs Uplands
	North Shore Highlands	4.7	North Shore Highlands
RVx54		**5.2**	**Clay/Mud River Shore**
	Glacial Lake Superior Plain	3.6	Glacial Lake Superior Plain

	Minnesota River Prairie	1.1	Minnesota River Prairie
	Oak Savanna	0.5	Oak Savanna
RVx54a		**51.1**	**Slumping Clay/Mud Slope (River)**
	Glacial Lake Superior Plain	46.4	Glacial Lake Superior Plain
	North Shore Highlands	4.7	North Shore Highlands
RVx54b		**13.5**	**Clay/Mud Shore (River)**
	Chippewa Plains	13.5	Chippewa Plains
			Laurentian Uplands
RVx54b1		**0.9**	**Clay/Mud River Shore (Intermittent Streambed Subtype)**
	Minnesota River Prairie	0.9	Minnesota River Prairie
RVx54b2		**1.7**	**Clay/Mud Shore (River): Permanent Stream Subtype**
	Glacial Lake Superior Plain	0.3	Glacial Lake Superior Plain
	Laurentian Uplands	0.6	Laurentian Uplands
	North Shore Highlands	0.9	North Shore Highlands
SEW_CX		**1092.5**	**Seepage Wetland Complex**
Aspen Parklands	Aspen Parklands	90.3	Aspen Parklands
	Red River Prairie	1002.2	Red River Prairie
SFS_CX		**83.8**	**Complex**
	Laurentian Uplands	83.8	Laurentian Uplands
SS_CX		**42.5**	**Shrub Swamp Complex**
	Hardwood Hills	3.1	Hardwood Hills
	Minnesota River Prairie	31.4	Minnesota River Prairie
	Pine Moraines & Outwash Plains	8.0	Pine Moraines & Outwash Plains
SWP_CX		**1667.4**	**Saline Wet Prairie Complex**
	Minnesota River Prairie	178.1	Minnesota River Prairie
Red River Prairie	Red River Prairie	1489.2	Red River Prairie

UPn12		**5.1**	**Northern Dry Prairie**
	Red River Prairie	5.1	Red River Prairie
UPn12a		**864.7**	**Dry Barrens Prairie (Northern)**
	Aspen Parklands	864.7	Aspen Parklands
UPn12b		**1196.2**	**Dry Sand - Gravel Prairie (Northern)**
Aspen Parklands	Aspen Parklands	746.9	Aspen Parklands
	Hardwood Hills	37.3	Hardwood Hills
Red River Prairie	Red River Prairie	412.0	Red River Prairie
UPn12c		**163.0**	**Dry Sand - Gravel Brush-Prairie (Northern)**
	Aspen Parklands	163.0	Aspen Parklands
UPn12d		**133.6**	**Dry Hill Prairie (Northern)**
	Hardwood Hills	**18.6**	Hardwood Hills
	Red River Prairie	114.9	Red River Prairie
UPn13		**237.2**	**Northern Dry Savanna**
	Aspen Parklands	237.2	Aspen Parklands
			Hardwood Hills
UPn13b		**608.6**	**Dry Barrens Oak Savanna (Northern)**
	Aspen Parklands	102.5	Aspen Parklands
	Hardwood Hills	0.5	Hardwood Hills
Red River Prairie	Red River Prairie	505.7	Red River Prairie
UPn13c		**959.1**	**Dry Sand - Gravel Oak Savanna (Northern)**
	Aspen Parklands	959.1	Aspen Parklands
			Hardwood Hills
UPn13d		**2.6**	**Dry Hill Oak Savanna (Northern)**
	Hardwood Hills	2.6	Hardwood Hills

UPn23		**1.9**	**Northern Mesic Prairie**
	Chippewa Plains	1.9	Chippewa Plains
UPn23a		**1434.0**	**Mesic Brush-Prairie (Northern)**
Aspen Parklands	Aspen Parklands	956.7	Aspen Parklands
	Red River Prairie	477.3	Red River Prairie
UPn23b		**10307.0**	**Mesic Prairie (Northern)**
Aspen Parklands	Aspen Parklands	2179.2	Aspen Parklands
	Hardwood Hills	73.0	Hardwood Hills
	Minnesota River Prairie	132.5	Minnesota River Prairie
Red River Prairie	Red River Prairie	7922.3	Red River Prairie
UPn24		**4.0**	**Northern Mesic Savanna**
	Aspen Parklands	4.0	Aspen Parklands
UPn24a		**38.7**	**Mesic Oak Savanna (Northern)**
	Red River Prairie	38.7	Red River Prairie
UPn24b		**33.0**	**Aspen Openings (Northern)**
	Aspen Parklands	33.0	Aspen Parklands
UPs13		**382.1**	**Southern Dry Prairie**
	Anoka Sand Plain	23.8	Anoka Sand Plain
	Coteau Moraines	6.2	Big Woods
	Hardwood Hills	3.2	Coteau Moraines
	Inner Coteau	73.8	Hardwood Hills
	Minnesota River Prairie	37.7	Inner Coteau
	St. Paul-Baldwin Plains	210.4	Minnesota River Prairie
	The Blufflands	27.0	St. Paul-Baldwin Plains
			The Blufflands
UPs13a		**1399.7**	**Dry Barrens Prairie (Southern)**
	Anoka Sand Plain	19.6	Anoka Sand Plain
	Big Woods	17.1	Big Woods
	Minnesota River Prairie	8.2	Minnesota River Prairie
Oak Savanna	Oak Savanna	80.2	Oak Savanna

St. Paul-Baldwin Plains	St. Paul-Baldwin Plains	65.3	Rochester Plateau
The Blufflands	The Blufflands	1209.3	St. Paul-Baldwin Plains
			The Blufflands
UPs13b		**4581.1**	**Dry Sand - Gravel Prairie (Southern)**
	Anoka Sand Plain	59.9	Anoka Sand Plain
	Big Woods	55.6	Big Woods
	Coteau Moraines	15.4	Coteau Moraines
Hardwood Hills	Hardwood Hills	955.5	Hardwood Hills
	Inner Coteau	349.3	Inner Coteau
Minnesota River Prairie	Minnesota River Prairie	2947.0	Minnesota River Prairie
Oak Savanna	Oak Savanna	48.4	Oak Savanna
	Red River Prairie	46.1	Pine Moraine & Outwash Plains
Rochester Plateau	Rochester Plateau	2.7	Red River Prairie
	St. Paul-Baldwin Plains	35.7	Rochester Plateau
The Blufflands	The Blufflands	66.8	St. Paul-Baldwin Plains
			The Blufflands
UPs13c		**2192.6**	**Dry Bedrock Bluff Prairie (Southern)**
	Big Woods	0.3	Big Woods
	Oak Savanna	118.1	Oak Savanna
Rochester Plateau	Rochester Plateau	27.4	Rochester Plateau
St. Paul-Baldwin Plains	St. Paul-Baldwin Plains	133.7	St. Paul-Baldwin Plains
The Blufflands	The Blufflands	1923.2	The Blufflands
UPs13d		**10643.5**	**Dry Hill Prairie (Southern)**
	Big Woods	21.9	Big Woods
Coteau Moraines	Coteau Moraines	4501.5	Coteau Moraines
	Hardwood Hills	14.9	Hardwood Hills
Inner Coteau	Inner Coteau	1518.6	Inner Coteau
Minnesota River Prairie	Minnesota River Prairie	4457.1	Minnesota River Prairie
	Oak Savanna	24.9	Oak Savanna
	Red River Prairie	104.7	Red River Prairie
UPs14		**265.8**	**Southern Dry Savanna**
	Anoka Sand Plain	63.1	Anoka Sand Plain
	Coteau Moraines	89.8	Coteau Moraines

	Pine Moraines & Outwash Plains	1.6	Pine Moraines & Outwash Plains
	St. Paul-Baldwin Plains	106.7	St. Paul-Baldwin Plains
	The Blufflands	4.7	The Blufflands
UPs14a		**98.2**	**Dry Barrens Oak Savanna (Southern)**
	Anoka Sand Plain	72.1	Anoka Sand Plain
	Hardwood Hills	0.5	Hardwood Hills
	The Blufflands	25.6	The Blufflands
UPs14a1		**200.5**	**Dry Barrens Oak Savanna (Southern): Jack Pine Subtype**
	Mille Lacs Uplands	23.7	Mille Lacs Uplands
	The Blufflands	176.8	The Blufflands
UPs14a2		2259.0	**Dry Barrens Oak Savanna (Southern): Oak Subtype**
Anoka Sand Plain	Anoka Sand Plain	842.1	Anoka Sand Plain
	Big Woods	45.1	Big Woods
	Mille Lacs Uplands	68.8	Mille Lacs Uplands
	Oak Savanna	2.5	Oak Savanna
The Blufflands	The Blufflands	1300.5	Rochester Plateau
			The Blufflands
UPs14a3		**261.0**	**Not listed in Field Guide to NPCs**
	Anoka Sand Plain	223.0	Anoka Sand Plain
	The Blufflands	38.0	The Blufflands
UPs14b		**753.0**	**Dry Sand - Gravel Oak Savanna (Southern)**
Anoka Sand Plain	Anoka Sand Plain	210.4	Anoka Sand Plain
	Big Woods	336.8	Big Woods
	Hardwood Hills	0.2	Hardwood Hills
	Mille Lacs Uplands	26.1	Mille Lacs Uplands
St. Paul-Baldwin Plains	St. Paul-Baldwin Plains	12.7	Minnesota River Prairie
	The Blufflands	166.8	Oak Savanna
			Rochester Plateau
			St. Paul-Baldwin Plains
			The Blufflands

UPs14c		**211.9**	**Dry Hill Oak Savanna (Southern)**
	Coteau Moraines	4.5	Big Woods
	Minnesota River Prairie	178.5	Coteau Moraines
	Oak Savanna	17.0	Minnesota River Prairie
	St. Paul-Baldwin Plains	11.9	Oak Savanna
			Rochester Plateau
			St. Paul-Baldwin Plains
UPs23		**38.8**	**Southern Mesic Prairie**
	Big Woods	0.5	Big Woods
	Coteau Moraines	11.1	Coteau Moraines
	Minnesota River Prairie	9.1	Minnesota River Prairie
	Oak Savanna	10.2	Oak Savanna
	Rochester Plateau	6.4	Rochester Plateau
	The Blufflands	1.4	The Blufflands
UPs23a		**18334.4**	**Mesic Prairie (Southern)**
	Anoka Sand Plain	51.4	Anoka Sand Plain
Big Woods	Big Woods	67.8	Big Woods
Coteau Moraines	Coteau Moraines	1148.3	Coteau Moraines
Hardwood Hills	Hardwood Hills	3.7	Hardwood Hills
	Inner Coteau	1304.4	Inner Coteau
Minnesota River Prairie	Minnesota River Prairie	14879.4	Mille Lacs Uplands
Oak Savanna	Oak Savanna	465.1	Minnesota River Prairie
	Red River Prairie	114.9	Oak Savanna
Rochester Plateau	Rochester Plateau	6.8	Red River Prairie
	St. Paul-Baldwin Plains	88.1	Rochester Plateau
	The Blufflands	204.6	St. Paul-Baldwin Plains
			The Blufflands
UPs24		**80.8**	**Southern Mesic Savanna**
	Hardwood Hills	80.8	Hardwood Hills
UPs24a		**46.7**	**Mesic Oak Savanna (Southern)**
	Anoka Sand Plain	2.9	Anoka Sand Plain
	Inner Coteau	4.1	Inner Coteau

	Mille Lacs Uplands	3.3	Mille Lacs Uplands
	Oak Savanna	30.5	Minnesota River Prairie
	Rochester Plateau	5.9	Oak Savanna
			Rochester Plateau
WFn53		**3990.6**	**Northern Wet Cedar Forest**
	Agassiz Lowlands	145.6	Agassiz Lowlands
	Border Lakes	25.4	Border Lakes
	Chippewa Plains	4.2	Chippewa Plains
	Nashwauk Uplands	10.5	Nashwauk Uplands
	North Shore Highlands	2834.5	North Shore Highlands
	St. Louis Moraines	160.4	St. Louis Moraines
	Tamarack Lowlands	35.9	Tamarack Lowlands
	Toimi Uplands	774.0	Toimi Uplands
			Lowland White Cedar Forest (North Shore)
WFn53a		**11469.3**	
Border Lakes	Border Lakes	305.8	Border Lakes
	Glacial Lake Superior Plain	74.3	Glacial Lake Superior Plain
	Laurentian Uplands	267.0	Laurentian Uplands
North Shore Highlands	North Shore Highlands	10805.1	North Shore Highlands
	Toimi Uplands	17.1	Toimi Uplands
WFn53b		**6043.1**	**Lowland White Cedar Forest (Northern)**
	Agassiz Lowlands	4305.7	Agassiz Lowlands
	Aspen Parklands	54.8	Aspen Parklands
	Border Lakes	134.3	Border Lakes
	Laurentian Uplands	908.5	Hardwood Hills
	Mille Lacs Uplands	80.4	Laurentian Uplands
	Nashwauk Uplands	30.1	Mille Lacs Uplands
	North Shore Highlands	15.4	Nashwauk Uplands
	Pine Moraines & Outwash Plains	25.2	North Shore Highlands
	St. Louis Moraines	255.8	Pine Moraines & Outwash Plains
	Tamarack Lowlands	183.5	St. Louis Moraines
	Toimi Uplands	49.3	Tamarack Lowlands
			Toimi Uplands

WFn55		**6000.8**	**Northern Wet Ash Swamp**
	Anoka Sand Plain	0.9	Anoka Sand Plain
	Aspen Parklands	1322.9	Aspen Parklands
	Border Lakes	3.4	Border Lakes
	Chippewa Plains	3.6	Chippewa Plains
	Glacial Lake Superior Plain	654.5	Glacial Lake Superior Plain
	Hardwood Hills	35.8	Hardwood Hills
	Laurentian Uplands	114.2	Laurentian Uplands
	Mille Lacs Uplands	948.1	Mille Lacs Uplands
	North Shore Highlands	510.3	North Shore Highlands
Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	340.3	Pine Moraines & Outwash Plains
	St. Louis Moraines	566.6	St. Louis Moraines
	Tamarack Lowlands	1195.1	Tamarack Lowlands
	Toimi Uplands	305.2	Toimi Uplands
WFn55a		**4283.0**	**Black Ash - Aspen - Balsam Poplar Swamp (Northeastern)**
	Agassiz Lowlands	1173.8	Agassiz Lowlands
	Anoka Sand Plain	2.1	Anoka Sand Plain
	Border Lakes	54.4	Border Lakes
	Chippewa Plains	103.2	Chippewa Plains
	Glacial Lake Superior Plain	57.4	Glacial Lake Superior Plain
	Laurentian Uplands	123.0	Laurentian Uplands
	Mille Lacs Uplands	41.7	Mille Lacs Uplands
North Shore Highlands	North Shore Highlands	1464.0	North Shore Highlands
	Pine Moraines & Outwash Plains	1029.3	Pine Moraines & Outwash Plains
	St. Louis Moraines	6.3	St. Louis Moraines
	Toimi Uplands	227.6	Toimi Uplands
WFn55b		**7533.4**	**Black Ash - Yellow Birch - Red Maple - Basswood Swamp (Eastcentral)**
Anoka Sand Plain	Anoka Sand Plain	1160.4	Anoka Sand Plain
	Hardwood Hills	65.4	Hardwood Hills
	Mille Lacs Uplands	5862.9	Mille Lacs Uplands
	Pine Moraines & Outwash Plains	432.9	Pine Moraines & Outwash Plains
St. Paul-Baldwin Plains	St. Paul-Baldwin Plains	11.8	St. Paul-Baldwin Plains

WFn55c		**989.7**	**Black Ash - Mountain Maple Swamp (Northern)**
	Aspen Parklands	18.2	Aspen Parklands
	Hardwood Hills	12.7	Hardwood Hills
	Laurentian Uplands	29.0	Laurentian Uplands
	Mille Lacs Uplands	37.9	Mille Lacs Uplands
	North Shore Highlands	424.1	North Shore Highlands
Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	308.0	Pine Moraines & Outwash Plains
	St. Louis Moraines	70.8	St. Louis Moraines
	Toimi Uplands	88.1	Toimi Uplands
WFn64		**1996.5**	**Northern Very Wet Ash Swamp**
	Border Lakes	2.6	Border Lakes
	Glacial Lake Superior Plain	71.2	Glacial Lake Superior Plain
	Hardwood Hills	51.2	Hardwood Hills
	Littlefork-Vermillion Uplands	0.5	Littlefork-Vermillion Uplands
	Mille Lacs Uplands	374.5	Mille Lacs Uplands
	North Shore Highlands	548.9	North Shore Highlands
	Pine Moraines & Outwash Plains	349.3	Pine Moraines & Outwash Plains
	St. Louis Moraines	324.0	St. Louis Moraines
	Tamarack Lowlands	1.0	Tamarack Lowlands
	Toimi Uplands	273.3	Toimi Uplands
WFn64a		**6755.0**	**Black Ash - Conifer Swamp (Northeastern)**
Border Lakes	Border Lakes	210.5	Border Lakes
	Glacial Lake Superior Plain	396.0	Glacial Lake Superior Plain
	Hardwood Hills	61.8	Hardwood Hills
	Laurentian Uplands	744.9	Laurentian Uplands
	Mille Lacs Uplands	257.3	Mille Lacs Uplands
	Nashwauk Uplands	39.5	Nashwauk Uplands
North Shore Highlands	North Shore Highlands	4715.0	North Shore Highlands
	St. Louis Moraines	102.8	St. Louis Moraines
	Toimi Uplands	226.6	Toimi Uplands
WFn64b		**3010.6**	**Black Ash - Yellow Birch - Red Maple - Alder Swamp**

	Anoka Sand Plain	55.3	Anoka Sand Plain
Big Woods	Big Woods	29.8	Big Woods
	Mille Lacs Uplands	2857.3	Mille Lacs Uplands
	St. Paul-Baldwin Plains	68.1	St. Paul-Baldwin Plains
WFn64c		**647.6**	**Black Ash - Alder Swamp (Northern)**
	Agassiz Lowlands	146.6	Aspen Parklands
	Border Lakes	35.7	Agassiz Lowlands
	Chippewa Plains	70.0	Border Lakes
	Hardwood Hills	28.8	Chippewa Plains
	Mille Lacs Uplands	59.6	Hardwood Hills
	North Shore Highlands	109.2	Mille Lacs Uplands
	Pine Moraines & Outwash Plains	48.8	North Shore Highlands
	Tamarack Lowlands	148.9	Pine Moraines & Outwash Plains
			Tamarack Lowlands
WFn74		**100.4**	**Northern Wet Alder Swamp**
	Hardwood Hills	1.6	Hardwood Hills
	Laurentian Uplands	7.2	Laurentian Uplands
	Mille Lacs Uplands	68.8	Mille Lacs Uplands
	Toimi Uplands	22.6	Toimi Uplands
WFn74a		**697.4**	**Alder - (Red Currant - Meadow-Rue) Swamp**
	Agassiz Lowlands	28.9	Agassiz Lowlands
	Chippewa Plains	4.7	Chippewa Plains
	Glacial Lake Superior Plain	127.9	Glacial Lake Superior Plain
	Mille Lacs Uplands	354.3	Mille Lacs Uplands
	Pine Moraines & Outwash Plains	160.2	Pine Moraines & Outwash Plains
	Red River Prairie	15.2	Red River Prairie
	St. Louis Moraines	6.2	St. Louis Moraines
WFs55		**9.4**	**Southern Wet Aspen Forest**
	Anoka Sand Plain	5.7	Anoka Sand Plain
	Oak Savanna	3.6	Oak Savanna
WFs55a		**263.2**	**Lowland Aspen Forest**

	Anoka Sand Plain	36.6	Anoka Sand Plain
	Big Woods	35.6	Big Woods
	Hardwood Hills	146.1	Hardwood Hills
	Oak Savanna	39.3	Minnesota River Prairie
	St. Paul-Baldwin Plains	5.7	Oak Savanna
			St. Paul-Baldwin Plains
WFs57		**67.1**	**Southern Wet Ash Swamp**
	Oak Savanna	37.7	Oak Savanna
	Pine Moraines & Outwash Plains	9.5	Pine Moraines & Outwash Plains
	St. Paul-Baldwin Plains	20.0	St. Paul-Baldwin Plains
WFs57a		**591.0**	**Black Ash - (Red Maple) Seepage Swamp**
	Anoka Sand Plain	0.6	Anoka Sand Plain
Hardwood Hills	Hardwood Hills	358.3	Big Woods
	Mille Lacs Uplands	2.0	Glacial Lake Superior Plain
Oak Savanna	Oak Savanna	35.2	Hardwood Hills
	St. Croix Moraine	57.4	Mille Lacs Uplands
St. Paul-Baldwin Plains	St. Paul-Baldwin Plains		Oak Savanna
			Rochester Plateau
			St. Croix Moraine
			St. Paul-Baldwin Plains
WFs57b		**81.0**	**Black Ash - Sugar Maple - Basswood - (Blue Beech) Seepage Swamp**
	Rochester Plateau	5.4	Rochester Plateau
The Blufflands	The Blufflands	75.6	The Blufflands
WFw54		**5051.3**	**Northwestern Wet Aspen Forest**
	Agassiz Lowlands	637.8	Agassiz Lowlands
Aspen Parklands	Aspen Parklands	4410.7	Aspen Parklands
	Hardwood Hills	2.9	Hardwood Hills
WFw54a		**1245.9**	**Lowland Black Ash - Aspen - Balsam Poplar Forest**
	Agassiz Lowlands	1003.1	Agassiz Lowlands
	Aspen Parklands	242.9	Aspen Parklands

WFWM_CX		**28.5**	**Complex**
	Laurentian Uplands	0.4	Laurentian Uplands
North Shore Highlands	North Shore Highlands	28.2	North Shore Highlands
WMn82		**2010.7**	**Northern Wet Meadow / Carr**
	Anoka Sand Plain	79.8	Anoka Sand Plain
	Aspen Parklands	14.9	Aspen Parklands
	Border Lakes	0.9	Border Lakes
	Chippewa Plains	67.0	Chippewa Plains
	Glacial Lake Superior Plain	9.4	Glacial Lake Superior Plain
	Hardwood Hills	104.0	Hardwood Hills
	Laurentian Uplands	449.3	Laurentian Uplands
	Mille Lacs Uplands	199.1	Mille Lacs Uplands
	Nashwauk Uplands	7.9	Nashwauk Uplands
	North Shore Highlands	738.4	North Shore Highlands
	Pine Moraines & Outwash Plains	19.4	Pine Moraines & Outwash Plains
	St. Louis Moraines	67.0	St. Louis Moraines
	St. Paul-Baldwin Plains	41.2	St. Paul-Baldwin Plains
	Toimi Uplands	212.5	Toimi Uplands
WMn82a		**33276.3**	**Willow - Dogwood Shrub Swamp**
	Agassiz Lowlands	3396.6	Agassiz Lowlands
Anoka Sand Plain	Anoka Sand Plain	2691.9	Anoka Sand Plain
	Aspen Parklands	9393.7	Aspen Parklands
Big Woods	Big Woods	85.9	Big Woods
	Border Lakes	209.5	Border Lakes
	Chippewa Plains	927.7	Chippewa Plains
	Glacial Lake Superior Plain	6.6	Glacial Lake Superior Plain
Hardwood Hills	Hardwood Hills	1420.3	Hardwood Hills
Laurentian Uplands	Laurentian Uplands	789.0	Laurentian Uplands
	Littlefork-Vermillion Uplands	41.3	Littlefork-Vermillion Uplands
	Mille Lacs Uplands	8382.6	Mille Lacs Uplands
Minnesota River Prairie	Minnesota River Prairie	356.0	Minnesota River Prairie
	Nashwauk Uplands	0.5	Nashwauk Uplands
	North Shore Highlands	1085.9	North Shore Highlands
	Oak Savanna	15.5	Oak Savanna

Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	1160.0	Pine Moraines & Outwash Plains
Red River Prairie	Red River Prairie	776.8	Red River Prairie
	St. Louis Moraines	321.9	Rochester Plateau
	St. Paul-Baldwin Plains	284.8	St. Louis Moraines
	Tamarack Lowlands	395.2	St. Paul-Baldwin Plains
	The Blufflands	40.3	Tamarack Lowlands
	Toimi Uplands	1493.2	The Blufflands
			Toimi Uplands
WMn82b		**27250.8**	**Sedge Meadow**
	Agassiz Lowlands	966.9	Agassiz Lowlands
Anoka Sand Plain	Anoka Sand Plain	2552.3	Anoka Sand Plain
	Aspen Parklands	68.1	Aspen Parklands
Big Woods	Big Woods	361.7	Big Woods
	Border Lakes	145.2	Border Lakes
	Chippewa Plains	1036.5	Chippewa Plains
	Glacial Lake Superior Plain	75.4	Glacial Lake Superior Plain
Hardwood Hills	Hardwood Hills	2077.5	Hardwood Hills
	Laurentian Uplands	137.0	Laurentian Uplands
	Littlefork-Vermillion Uplands	0.4	Littlefork-Vermillion Uplands
	Mille Lacs Uplands	13550.4	Mille Lacs Uplands
Minnesota River Prairie	Minnesota River Prairie	580.0	Minnesota River Prairie
	Nashwauk Uplands	5.1	Nashwauk Uplands
	North Shore Highlands	275.6	North Shore Highlands
Oak Savanna	Oak Savanna	43.0	Oak Savanna
Pine Moraines & Outwash Plai	Pine Moraines & Outwash Plains	2973.0	Pine Moraines & Outwash Plains
Red River Prairie	Red River Prairie	381.4	Red River Prairie
	Rochester Plateau	47.5	Rochester Plateau
	St. Louis Moraines	170.2	St. Louis Moraines
	St. Paul-Baldwin Plains	25.7	St. Paul-Baldwin Plains
	Tamarack Lowlands	32.0	Tamarack Lowlands
The Blufflands	The Blufflands	1508.9	The Blufflands
	Toimi Uplands	227.2	Toimi Uplands
WMn82b1		**159.2**	**Sedge Meadow: Bluejoint Subtype**
	Agassiz Lowlands	6.7	Agassiz Lowlands
	Chippewa Plains	8.7	Big Woods
	Hardwood Hills	112.0	Chippewa Plains

	Nashwauk Uplands	2.3	Hardwood Hills
	North Shore Highlands	29.5	Nashwauk Uplands
			North Shore Highlands
WMn82b2		**129.7**	**Sedge Meadow: Tussock Sedge Subtype**
	Anoka Sand Plain	106.1	Anoka Sand Plain
	Big Woods	0.7	Big Woods
	Mille Lacs Uplands	4.4	Hardwood Hills
	Oak Savanna	18.4	Mille Lacs Uplands
			Oak Savanna
WMn82b3		**4.5**	**Sedge Meadow: Beaked Sedge Subtype**
	North Shore Highlands	0.6	Hardwood Hills
	Pine Moraines & Outwash Plains	0.4	North Shore Highlands
Red River Prairie	Red River Prairie	3.4	Pine Moraines & Outwash Plains
			Red River Prairie
WMn82b4		**85.8**	**Sedge Meadow: Lake Sedge Subtype**
	Agassiz Lowlands	5.3	Agassiz Lowlands
	Big Woods	53.8	Big Woods
	Hardwood Hills	0.7	Hardwood Hills
	Mille Lacs Uplands	5.6	Mille Lacs Uplands
	Nashwauk Uplands	0.4	Nashwauk Uplands
	North Shore Highlands	2.3	North Shore Highlands
	Pine Moraines & Outwash Plains	14.2	Pine Moraines & Outwash Plains
Red River Prairie	Red River Prairie	2.7	Red River Prairie
	St. Louis Moraines	0.8	St. Louis Moraines
WMn82b5		**0.5**	**Sedge Meadow: Lake Sedge Subtype DUPLICATE?**
	Red River Prairie	0.5	North Shore Highlands
			Red River Prairie
WMp73		**147.0**	**Prairie Wet Meadow/Carr**
Coteau Moraines	Coteau Moraines	139.4	Coteau Moraines
	Minnesota River Prairie	7.6	Minnesota River Prairie

WMp73a		**3295.9**	**Prairie Meadow/Carr**
	Agassiz Lowlands	120.8	Agassiz Lowlands
Aspen Parklands	Aspen Parklands	2599.9	Aspen Parklands
Coteau Moraines	Coteau Moraines	67.8	Coteau Moraines
	Hardwood Hills	20.1	Hardwood Hills
Inner Coteau	Inner Coteau	263.4	Inner Coteau
Minnesota River Prairie	Minnesota River Prairie	48.0	Minnesota River Prairie
Red River Prairie	Red River Prairie	176.0	Red River Prairie
WMs83		**304.1**	**Southern Seepage Meadow/Carr**
Aspen Parklands	Aspen Parklands	44.8	Aspen Parklands
	Big Woods	14.1	Big Woods
Coteau Moraines	Coteau Moraines	81.2	Coteau Moraines
	Minnesota River Prairie	105.2	Minnesota River Prairie
	Oak Savanna	6.2	Oak Savanna
	Red River Prairie	8.3	Red River Prairie
	St. Paul-Baldwin Plains	46.4	St. Paul-Baldwin Plains
WMs83a		**4445.3**	**Seepage Meadow/Carr**
Anoka Sand Plain	Anoka Sand Plain	74.4	Anoka Sand Plain
Aspen Parklands	Aspen Parklands	565.4	Aspen Parklands
Big Woods	Big Woods	473.2	Big Woods
Coteau Moraines	Coteau Moraines	21.5	Coteau Moraines
	Hardwood Hills	146.1	Hardwood Hills
	Inner Coteau	22.4	Inner Coteau
	Minnesota River Prairie	177.5	Minnesota River Prairie
	Oak Savanna	483.6	Oak Savanna
	Red River Prairie	1813.7	Red River Prairie
	Rochester Plateau	1.7	Rochester Plateau
	St. Paul-Baldwin Plains	452.5	St. Paul-Baldwin Plains
	The Blufflands	213.3	The Blufflands
WMs83a1		**403.6**	**Seepage Meadow/Carr Tussock: Sedge Subtype**
	Aspen Parklands	3.1	Aspen Parklands
	Coteau Moraines	0.1	Big Woods
	Inner Coteau	85.5	Coteau Moraines

	Oak Savanna	98.2	Hardwood Hills
	Red River Prairie	0.5	Inner Coteau
	Rochester Plateau	102.6	Minnesota River Prairie
	The Blufflands	113.6	Oak Savanna
			Red River Prairie
			Rochester Plateau
			St. Paul Baldwin Plains
			The Blufflands
WMs83a2		**40.5**	**Seepage Meadow/Carr: Aquatic Sedge Subtype**
	Inner Coteau	2.0	Coteau Moraine
	Red River Prairie	38.5	Inner Coteau
			Red River Prairie
			St. Paul Baldwin Moraine
WMs83a3		**17.5**	**Seepage Meadow/Carr: Impatiens Subtype**
	Coteau Moraines	4.9	Coteau Moraines
	The Blufflands	12.6	Minnesota River Prairie
			The Blufflands
WMs92		**308.7**	**Southern Basin Wet Meadow/Carr**
	Coteau Moraines	184.9	Coteau Moraines
	Hardwood Hills	13.3	Hardwood Hills
	Minnesota River Prairie	101.3	Minnesota River Prairie
	Oak Savanna	9.2	Oak Savanna
WMs92a		**341.5**	**Basin Meadow/Carr**
	Aspen Parklands	22.8	Aspen Parklands
	Hardwood Hills	14.9	Big Woods
	Inner Coteau	0.3	Hardwood Hills
	Minnesota River Prairie	13.9	Inner Coteau
Red River Prairie	Red River Prairie	289.6	Minnesota River Prairie
			Red River Prairie
WPn53		**956.1**	**Northern Wet Prairie**
	Aspen Parklands	389.5	Aspen Parklands

Red River Prairie	Red River Prairie	566.6	Red River Prairie
WPn53a		**1575.9**	**Wet Seepage Prairie (Northern)**
	Aspen Parklands	1226.0	Aspen Parklands
Red River Prairie	Red River Prairie	349.9	Red River Prairie
WPn53b		**3480.5**	**Wet Brush-Prairie (Northern)**
Aspen Parklands	Aspen Parklands	2952.1	Aspen Parklands
	Hardwood Hills	4.0	Hardwood Hills
Red River Prairie	Red River Prairie	524.3	Red River Prairie
WPn53c		**8718.0**	**Wet Prairie (Northern)**
Aspen Parklands	Aspen Parklands	1503.2	Aspen Parklands
	Minnesota River Prairie	0.7	Minnesota River Prairie
Red River Prairie	Red River Prairie	7214.1	Red River Prairie
WPn53d		**686.2**	**Wet Saline Prairie (Northern)**
	Aspen Parklands	434.0	Aspen Parklands
Red River Prairie	Red River Prairie	252.1	Red River Prairie
WPs54		**132.7**	**Southern Wet Prairie**
	Anoka Sand Plain	10.5	Anoka Sand Plain
	Coteau Moraines	55.7	Coteau Moraines
	Inner Coteau	13.5	Inner Coteau
	Minnesota River Prairie	10.6	Minnesota River Prairie
Oak Savanna	Oak Savanna	28.0	Oak Savanna
	The Blufflands	14.4	The Blufflands
WPs54a		**466.9**	**Wet Seepage Prairie (Southern)**
	Big Woods	163.4	Big Woods
	Inner Coteau	5.0	Inner Coteau
	Minnesota River Prairie	64.6	Minnesota River Prairie
	Oak Savanna	233.9	Oak Savanna
WPs54b		**4578.1**	**Wet Seepage Prairie (Southern)**
Anoka Sand Plain	Anoka Sand Plain	204.5	Anoka Sand Plain
	Big Woods	5.8	Big Woods

Coteau Moraines	Coteau Moraines	706.8	Coteau Moraines
Inner Coteau	Inner Coteau	581.4	Inner Coteau
Minnesota River Prairie	Minnesota River Prairie	3036.0	Minnesota River Prairie
Oak Savanna	Oak Savanna	44.1	Oak Savanna
			Red River Prairie
			Rochester Plateau
			St. Paul Baldwin Plains
WPs54c		**4578.1**	**Wet Saline Prairie (Southern)**
			Coteau Moraine
			Minnesota River Prairie
YF_CX		**40849.5**	**Young Forest Complex**
	Border Lakes	420.7	Border Lakes
	Glacial Lake Superior Plain	947.0	Glacial Lake Superior Plain
	Hardwood Hills	344.2	Hardwood Hills
Laurentian Uplands	Laurentian Uplands	5719.7	Laurentian Uplands
	Mille Lacs Uplands	10957.1	Mille Lacs Uplands
	Nashwauk Uplands	0.7	Nashwauk Uplands
North Shore Highlands	North Shore Highlands	11673.8	North Shore Highlands
	Pine Moraines & Outwash Plains	2889.9	Pine Moraines & Outwash Plains
	St. Louis Moraines	766.0	St. Louis Moraines
	Tamarack Lowlands	3.4	Tamarack Lowlands
	Toimi Uplands	7126.9	Toimi Uplands

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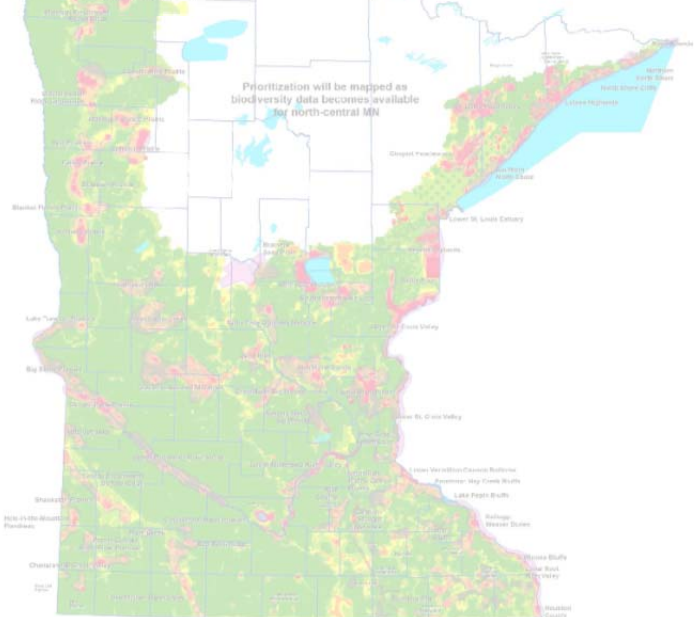
Scientific and Natural Area (SNA) Strategic Land Protection Plan

Minnesota Department of Natural Resources
Division of Ecological and Water Resources
Scientific and Natural Area Program

Minnesota Scientific & Natural Areas



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This report is available in other formats. Please contact the SNA Program at sna.dnr@state.mn.us

Note: The following parts of this Plan are not integrated into this document:

- Appendix A. Gap Analysis Results - Native Plant Communities
- Part 2 Conservation Opportunity Areas Descriptions

Also, this draft of the plan will be updated with newer versions of Figures 4, 6, and 10.

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With sincere appreciation,

SNA STRATEGIC PLANNING TEAM
Peggy Booth, SNA Program Supervisor
Bill Bleckwenn, Principal Planner

Executive Summary

The SNA Strategic Land Protection Plan (Plan) provides a multi-tiered approach for prioritizing lands to protect through designation as a state Scientific & Natural Area (SNA). A secondary purpose is to identify and prioritize areas for conserving biodiversity and rare natural resources.

The previous SNA Long Range Plan has not fundamentally changed since 1976. A new Strategic Land Protection Plan is needed and possible because of the following.

1. Impacts to native ecosystems from development, agricultural conversion, fragmentation, human disturbance, and invasive species
2. The need for more robust prioritization of candidates for acquisition
3. The need for identifying opportunities and priorities for the broader conservation community to conserve biodiversity and rare resources
4. Funding opportunities through the Environment and Natural Resources Trust Fund and the Outdoor Heritage Fund

The development of the plan was *facilitated* by a grant from the Environment and Natural Resources Fund as recommended by the Legislative-Citizens Commission on Minnesota Resources., A scientific means of prioritizing future conservation efforts is facilitated by decision-support systems and the expertize of scientists and professionals with local and statewide knowledge.

The Plan specifies two goals and six objectives towards conserving the state's natural heritage and achieving SNA system purposes. The primary goal: The state's natural heritage is not lost from any ecological region of Minnesota. The secondary goal: The state SNA system provides the people with opportunities for compatible nature-based recreation, education, and scientific opportunities. The objectives define the parameters to support the goals. This includes occurrences of existing native plant communities, plant and animal species, geological features, protection and conservation, conserving natural heritage, contributing ecological values in watershed, and sustainability.

SNAs protect areas of greatest biodiversity significance, native plant communities, habitat for rare species, and significant unique natural features such as geological formations. They are to be established through multiple approaches including designating SNAs on existing public lands, acquisition, and leasing.

At a statewide scale, a gap analysis evaluated which native plant communities in each ecological subsection are already protected within existing SNAs and the broader conservation network. Over 125 native plant community (NPC) types and subtypes have no representation within any SNAs across the state. Only 16% to 41% are protected by SNAs when considered by subsection. Marxan decision-support software prioritized the protection of areas that support the greatest range of biodiversity the most efficiently. The data produced a Conservation Prioritization Results map that identified high priority areas for biodiversity conservation.

If 10% of these high priority areas become SNAs, the state could protect approximately 300 SNAs by the end of the 21st century. This totals about 325,000 acres or 0.6 % of the state, and means designating 136,000 more acres of SNA over the next 85 years. In the next twenty years, SNA protection would be targeted as follows: 40% for the Prairie Parkland ecological province, 30% for the Laurentian Mixed Forest province, 20% for the Eastern Broadleaf Forest, and 10% for the Tall-grass Aspen Parkland. Aspen Parkland is the smallest province of the four, and its proportion is a function of its small size.

At a regional (multi-county) landscape scale, the Plan names and describes Conservation Opportunity Areas (also called Opportunity Areas) to focus the work of the SNA Program, partners, and others in protecting biodiversity and rare features. Each of the 84 Opportunity Areas to date are identified in a in 4-page descriptions in Part 2 of the Plan. These Opportunity Areas range in size from approximately 1,200 acres to 410,000 acres.

At the smaller parcel level, the Plan provides a method to prioritize sites for potential SNA designation. The SNA Candidate Site Evaluation Guide was developed through this planning process to help rate each candidate site and to make informed decisions about whether to pursue potential acquisitions and designations. The Site Evaluation Guide has been tested and used on a number of sites. The Guide is a useful way of quantitatively sifting out sites that are not priorities as SNAs and to keep future additions in line with the goals and objectives of the program.

The methods used in this planning process require extensive ecological survey data. Therefore, landscape level priorities have been identified throughout the state in those subsections where the Minnesota Biological Survey work is complete. As data become available, subsequent versions of this Plan will contain additional prioritization results and opportunity area identification and descriptions.

The future of natural areas and rare natural features depends upon conservation across all ownerships. The SNA Program and the DNR look forward to building relationships with individuals and organizations across all ownerships to implement this Plan in conserving the state's natural areas and rare resources.

Purpose and Scope of this Plan

The primary purpose of this Plan is to provide a multi-tiered approach for prioritizing lands to protect through designation as a state Scientific & Natural Area (SNA). A secondary purpose is to identify and prioritize areas for conserving biodiversity and rare natural resources.

At a larger statewide scale, this Plan prioritizes protection of geographic areas that contain the state's range of biodiversity. At an intermediate landscape scale, the Plan names and describes Conservation Opportunity Areas that focus the work of the SNA Program, partners, and local landowners/jurisdictions in protecting biodiversity and rare features. At the smaller parcel level, the Plan provides a method to prioritize candidate sites to become SNAs.

The SNA Strategic Land Protection Plan replaces all previous versions of the *SNA Long Range Plan* that has been substantially the same since it was initially prepared in 1979-80.

By intention, this Plan does not include other components of the SNA Program (namely Native Prairie Bank and Natural Area Registry) nor administration and operations of the SNA Program. The SNA Program administration is directed by Department of Natural Resources (DNR) Operational Order #29, which was updated and approved by the DNR Commissioner in 2012. The Operational Order authorizes creation and use of the *SNA Program Administrative Handbook* to contain a series of operational directives. The *SNA Program Administrative Handbook* (under development) will contain four sections (or chapters) as follows: (1) Land Protection and Acquisition; (2) Natural Resource Restoration and Management (3) Facility and Public Use Management; and (4) Administration and Coordination.

This 2014 document is an interim version of the SNA Strategic Land Protection Plan. The Conservation Prioritization Map and Conservation Opportunity Areas sections of this Plan are dependent on extensive baseline ecological survey data for each ecological subsection of the state. For this reason, these portions of the Plan have not been done for the following eight ecological subsections of the state: Agassiz Lowlands, Border Lakes, Chippewa Plains, Littlefork Vermillion Uplands, Nashwauk Uplands, Pine Moraines and Outwash Plains, St. Louis Moraines, and Tamarack Lowlands. In addition, a few areas of other subsections were based on preliminary data. As additional information becomes available, primarily through the Minnesota Biological Survey, the Plan will be updated with these new areas.

In addition, this Plan does not fully address some important natural features SNAs are authorized to protect. This is particularly true of geological features of statewide significance, including land formations and fossil evidence. The DNR will be considering how to identify and prioritize candidate geological features, the relationship between the State Wildlife Action Plan (currently under revision), and future versions of SNA plans.

Scientific and Natural Area Basics

For the purposes of this plan, a "natural area" is any place composed of native plant communities and natural features that are generally unaffected by human impacts. This plan focuses on lands officially designated as Scientific and Natural Areas by the Minnesota Commissioner of Natural Resources. The plan also recognizes the critical importance of conservation of other natural areas by numerous organizations and individuals.

Purpose of SNAs

Scientific and Natural Areas (SNAs) are established to protect and perpetuate natural features which possess exceptional scientific or educational value, in an undisturbed natural state. SNAs are primarily composed of native plant communities, populations of rare species, and geological features of statewide significance. By law, they may also be places that contain successional processes, relict flora or fauna, natural formations, fossil evidence, habitat for concentrations of animals, or vantage points for observing concentrated animal populations, such as migration routes. Often the places which contain these natural features are recognized as areas of biodiversity significance.

Legislative Authority and State Law Regarding SNAs

Under the state Outdoor Recreation Act enacted by the Minnesota Legislature in 1975, SNAs became part of the State Outdoor Recreation System administered by the Department of Natural Resources.

The primary Minnesota Statutes (M.S.) governing the acquisition and use of lands as SNAs are as follows:

- **M.S. 84.033:** Authorizes the acquisition through gift, lease, conservation easement, exchange, or purchase, and the designation of SNAs; requires county board approval to acquire [purchase in fee] SNAs following the procedures under Section 97A.145, subd. 2.
- **M.S. 84.035-36 (Peatlands):** Establishes peatland SNAs on state-owned land within 18 specified peatland boundaries**.**
- **M.S. 84.944 (Critical Habitat):** Provides considerations for the acquisition of critical habitat and directs acquisition of lands follow the county board approval process as provided in 97A.145.
- **M.S. 86A.05, Subd. 5 (Outdoor Recreation System):** Establishes SNAs as part of the Outdoor Recreation System and defines their purpose, criteria, uses, and procedures for changes in use. This includes a provision that physical development in SNAs be limited to the facilities absolutely necessary for protection, research, and educational projects, and, where appropriate, for interpretive services.
- **M.S. 92.69 (Endowment Account for Lakeshore Lease Proceeds):** Directs the proceeds of the Laws of 1986, chapter 449, sections 1-3, to the land acquisition account (M.S. 94.165) to be spent only to acquire SNAs. *Note: the proceeds have been dropping annually and as of 2014 are under $4000 per year.*
- **M.S. 97A.093:** Allows opening SNAs to hunting, fishing or trapping in through Commissioner's Designation Order and provides for opening previously designated sites through a public hearing process.

- **M.S. 97A.145:** Directs land acquisition including county board notification and approval.

Several chapters of Minnesota Rules (M.R.) also provide protections for lands established as SNAs.

- M. R. 6136 sets forth the general provisions for use of SNAs; activities prohibited unless otherwise allowed by designation order or permit; criteria for allowing otherwise prohibited activities by permit or designation order and types of conditions that may be placed on these activities. This rule also specifies that it is unlawful for any person to destroy, injure, damage, molest, or remove any natural resources.
- M.R. 6130.1200 generally prohibits taconite mining within SNAs. M.R. 6132.200 regarding the siting of non-ferrous mining (such as copper and nickel) prohibits mining within state SNAs and with state peatland SNAs under some conditions and also prohibits surface disturbance from mining activities within ¼ mile of a state SNA.
- M.R. 4410.4300, Subpart 30 requires a mandatory Environmental Assessment Worksheet for any proposed permanent physical encroachment on an SNA that is inconsistent with state law or a management plan.

Evolution of the SNA Program

In the mid-1960s, in association with a surge in federal environmental protection laws, people across the United States began talking about protecting natural areas and habitats for rare species. Concerned citizens urged Minnesota to be one of the first states to create state owned and managed natural areas. In 1965, the Commissioner's Advisory Committee (CAC) – a 15-member panel of citizens with expertise or interest in biological and geological sciences – was formed to advise the DNR Commissioner on state natural areas and to encourage the legislature to establish a natural area program.

State-administered SNAs were initially authorized by the Minnesota Legislature in 1969 (M.S. 84.033). The first SNA unit was acquired in 1974 to preserve a heron rookery. And, as stated above, in 1975, SNAs became one of the unit types administered by the DNR under the state Outdoor Recreation System.

Administration of SNAs grew into the SNA Program with the addition of other tools aimed at protecting natural areas. In 1986, the Natural Area Registry moved from DNR's Natural Heritage Program to the SNA Program. In 1987, the legislature gave new directions to the Department to conserve native prairie. Specifically, a Prairie Biologist position and authority to acquire and administer Native Prairie Bank conservation easements were added to the SNA Program (M.S. 84.96 and 84.961). This Plan focuses on SNAs explicitly. However, the Partners Section of this Plan, starting on page 54, describes the natural area protection roles of Native Prairie Bank easements and Natural Area Registry agreements within the SNA Program, as well as land ownerships and tools outside the SNA Program. In 1991 the state legislature identified 18 areas of high quality representative patterned peatland and designated lands in 16 of these areas as SNAs through the Wetland Conservation Act.

Over time, responsibility for SNAs shifted within the DNR, including being administered by State Parks and being within the Ecological Services Section of the Division of Fish and Wildlife. In 2000, Ecological Services became its own Division including the SNA Program.

In 2011, the home of the SNA Program became the Ecosystem Management and Protection Section of the DNR Division of Ecological and Water Resources (EWR). This Section of EWR also includes the Nongame Wildlife Program, Invasive Species Program, and responsibilities for protection of state listed species and the State Wildlife Action Plan. The SNA Program works closely with these programs and the Minnesota Biological Survey, which is in a different Section in the EWR Division.

Until about 2008, the SNA Program was largely operated out of the DNR Central Office in St. Paul, with a centralized field crew, a Prairie Biologist in western Minnesota, and an SNA forest specialist in northeastern Minnesota. As part of the larger decentralization process of the Division, the SNA Program now has offices and staff in each of the four DNR regions across the state. While staffing is largely dependent on project funding, the SNA Program now has about 15 full time staff in the regions and about 5-6 in Central Office.

SNA Lands

The SNA Program now administers 159 SNAs totaling over 189,000 acres (Table 1). Almost 80% of the SNA acreage is the peatland SNAs which were state lands administered by DNR Forestry or DNR Wildlife and were designated as SNAs by statute. *(Note: In statute, the legislature identified 18 peatland SNA boundary areas, but also specified that only state lands within these boundaries are designated as SNA. Wawina and Nett Lake have no state lands; therefore they have zero acres of designated SNAs, yet are included in the total number of SNAS above.)*

SNAs may be designated on lands owned in fee or easement by the DNR and acquired through purchase or donation. SNAs may also be acquired through land exchange. SNAs include some received from other state agencies or other DNR Divisions. Not counting Native Prairie Bank easements, the SNA Program administers 18 conservation easements, on all or part of 10 SNAs.

In addition to acquiring lands directly, SNAs may be designated as secondary units on state lands whose primary administrator is another DNR Division. Currently, 7 SNAs have been designated on DNR Forestry-administered lands and 5 SNAs are within State Parks administered by the Division of Parks and Trails.

Law also allows SNAs to be designated on lands leased by the DNR. The only SNA leased lands are owned as preserves by The Nature Conservancy (TNC) who manages them cooperatively with DNR. No new leased SNAs have been established since the 1980s.

Table 1. Ownership Status of SNAs

	# of SNAs	Acres	% Area
SNAs acquired in fee (purchased or donated *all or in part*)	122	29,020	15%
Statutory Peatland SNAs (counting 2 statutory named peatlands with no state acreage)	18	148,750	79%
SNAs designated on DNR Forestry or Parks land (# of SNAs are those which are *all or in part*)	12	5,080	3%
SNAs held through DNR conservation easement (# of SNAs are those which are *all or in part*; acres are only those in which a non-DNR entity owns the land in fee)	10	810	<1%

SNAs designated on leased lands ((# of SNAs are those which are all or in part leased)	14	5,410	3%
TOTAL	159	189,070	

Notes: Size is rounded to nearest 10 acres
Unit #s listed above do not add up to total since some units are a mix of ownership types.

SNAs are generally well distributed throughout each of Minnesota's ecological provinces. However, currently three of the state's 24 ecological subsections have no SNAs. The Laurentian Mixed Forest Province of northeastern Minnesota is both the largest province in the state and contains large peatland SNAs comprising 86% of the SNA acreage. That is, SNAs are already 0.7 % of the land area of this province. In contrast, SNAs have a lesser presence in the Prairie Parkland and Eastern Broadleaf Forest Provinces of the state, comprising 0.07% and 0.09% of these provinces respectively. The current average (mean) size of an SNA is 1,189 acres. If the peatland SNAs are not included, the average becomes 285 acres.

Table 2. Numbers and Size of SNAs by Ecological Province

Province	Province Area (acres)	% of State in Province	# of SNAs	Total SNA Area (acres)	% of province in SNAs	% of state's SNAs in province	Avg. Size SNAs (acres)	# of non-peatland SNAs	Total non-peatland SNA Area (acres)	Avg. Size of non-peatland SNAs (acres)
Tallgrass Aspen Parkland	2,906,100	5%	4	5,558	0.19%	3%	1,390	4	5,558	1,390
Prairie Parkland	16,094,400	30%	40	10,699	0.07%	6%	267	40	10,699	267
Laurentian Mixed Forest	23,166,100	43%	57	162,009	0.70%	86%	2,842	39	13,139	337
Eastern Broadleaf Forest	11,839,400	22%	58	10,801	0.09%	6%	186	58	10,801	186
TOTAL	54,006,000	100%	159	189,067	0.35%	100%	1,189	141	40,197	285

Public Use of SNAs

The State Outdoor Recreation System states that SNAs are designated as Research Units, Educational Units, or Public Use Units. Nearly all SNAs are designated as Public Use Units. Nearly all the SNAs are open to everyone throughout the year for hiking, bird-watching, nature photography, snowshoeing and other activities that do not disturb natural conditions. Additional public recreational uses may be allowed on an SNA that are otherwise prohibited in law if so specified in the Commissioner's Designation Order establishing a specific SNA.

Many SNAs provide opportunities for hunting and fishing. About 88% of the acres designated as SNA are open to some form of public hunting. As of the 2013 hunting season: about 25 SNAs (79% of the SNA acreage including the peatland SNAs) are open to all public hunting and trapping; another 21 SNAs (3% of the SNA acreage) are open to all public hunting; and another 18 SNAs (5% of the SNA acreage) are

open to some forms of hunting (such as deer only or archery only or special hunts). Fishing is allowed at 28 SNAs. Dogs are allowed at about 25 SNAs (usually in association with hunting).

A few SNAs offer limited opportunities for trail uses, where trails existed prior to establishment as an SNA or where they are allowed through management with a partner entity. Three SNAs have authorized pedestrian trails, though field roads and other paths are known to remain on a number of other SNAs. One SNA is transected by a developed regional non-motorized bicycle trail; another bicycle trail is allowed in the designation order and its development is starting by the local government. Horses (and horse trails which existed prior to SNA designation) are only allowed at one SNA and are proposed for an SNA being acquired by a partner organization. The peatland SNAs and a few other SNAs have grandfathered grant-in-aid snowmobile trails.

Out of the 159 SNAs, only 9 SNAs have restrictions on public access. A few SNAs are not open to the public during some times or in some part of the SNA in order to protect vulnerable resources such as nesting birds or fragile slopes. Only one SNA does not allow any public access because of security concerns given its location at an airport.

SNA Program Funding

The SNA Program is funded through appropriations made by the Minnesota legislature. The amount of general funding allocated to the SNA Program is usually less than $500,000 annually and has not increased in at least the last 8 years despite increases in lands administered and program staff. The Program also receives modest Heritage Enhancement appropriations for prairie-related work and a very small amount of invasive species-related general fund. The Program's two largest sources of funding are received through annual competitive grant processes and subsequent legislative appropriations.

The Environment and Natural Resource Trust Fund (ENRTF) comes from state lottery proceeds. Those allocations are recommended by the Legislative-Citizens' Commission on Minnesota Resources following an open competitive process. For the last 3 decades, the ENRTF has been the SNA Program's largest source of funding. As authorized through an approved work plan, the ENRTF may be used broadly to support the SNA Program. Over the years, ENRTF has funded a substantial amount of the SNA acquisitions. Current ENRTF appropriations support SNA outreach and education (including electronic and social media and an expanded volunteer site steward network), SNA management plans and monitoring, as well as acquisition, restoration, enhancement, and site development. Preparation of this Plan was made possible by an ENRTF grant.

The Outdoor Heritage Fund (OHF) is supported by state sales tax as approved by the people of Minnesota in 2008 through the Legacy constitutional amendment. This funding is appropriated by the Legislature based on recommendations by the Lessard-Sams Outdoor Heritage Council through an open competitive grant process. The constitutional amendment only allows the OHF to be used on acquisition (fee or easement), restoration, and enhancement of prairie, forest, wetlands, and other wildlife habitat. All lands acquired in fee with OHF must be open to all taking of game (hunting and trapping) during the regular season unless otherwise provided in law.

In some biennia, the Program also receives sizable appropriations of state general obligation bonds. This bonding is only for acquisition, site development and some restoration/enhancement work of a capital nature. No new SNA bonding has been appropriated since 2008.

The State-authorized Reinvest in Minnesota (RIM) Critical Habitat account also provides funds primarily for acquisition, including SNAs. Its sources of funds are sales of Critical Habitat vehicle license plates, legislative appropriations, and donations. Through RIM Critical Habitat, the appraised value of lands donated to the DNR by private organizations or individuals generates a match of equal value, which goes towards additional land acquisitions.

A number of organizations and individuals donate to the SNA. Of these, the Nature Conservancy has donated the most land. Other land donating organizations include the Isaak Walton League, Minnesota Land Trust, and the Minnehaha Creek Watershed District. Sizable direct cash contributions have also been made by partners acquiring land for and with the SNA Program. This includes the Trust for Public Land, Dakota County, Friends of the Mississippi River, The Conservation Fund, etc. Donations for SNA operations are received from the Native Plant Society of Minnesota, individual artists in Project Art for Nature, and individual donors.

Occasionally, the SNA Program receives federal funding, such as through the State Wildlife Grant Program or the Lake Superior Coastal Zone Management Program.

From all sources, the level of funding to acquire lands as SNAs is typically about $1 million to $2 million a year. This may protect about 300-1000 acres per year. A *Long Range Budget Analysis of Land Management Needs* report prepared for the Legislature in 2010 projected a need of acquiring 1980 acres per year for SNAs at an estimated cost of about $9.9 million. To meet guidelines for fully restoring and managing SNA lands, this report estimated that the Department could use about $1.4 million more annually for existing SNAs and another $220,000 annually for each additional 2000 acres acquired.

Previous SNA Plans

1979-80 SNA Long Range Plan

The *SNA Long Range Plan* was developed in 1979 with a full version of it completed in July 1980. That plan focused on land protection (SNA identification, evaluation, and designation), but also had a paragraph on management and use of SNAs and a section on budgets.

The goal of the SNA system as set forth in the 1979-80 *SNA Long Range Plan* is:

> *To preserve and perpetuate the ecological diversity of Minnesota's natural heritage, including landforms, fossil remains, plant and animal communities, rare and endangered species or other biotic features, and geological formations, for scientific study and public edification as components of a healthy environment.*

The 1979-80 plan established the following two Protection Objectives:

1. *To protect through SNA designation up to three occurrences of each of the following Elements: plants, animals, geological features, or other special features within each landscape region where they occur. Other occurrences may be registered.*
2. *To protect through SNA designation up to five occurrences of each plant community Element within each landscape region where they occur. Other occurrences may be registered.*

The second native plant community objective was considered a coarse filter capturing most species. The first objective was considered a fine filter to achieve protection of elements (species or natural features) not predictably associated with native plant community types. It stated that multiple occurrences are necessary to prevent loss from catastrophes (such as oil spills, storms, etc), for research and education purposes, and to protect variances in species (i.e., genetic diversity). The 1979-80 Plan anticipated that on order to reach the objectives, 0.1% of the state would need to be protected (one tenth of one percent, listed in the plan as 52,000 acres).

The 1979-80 plan also directed that the following criteria be used in ranking areas for possible SNA designation:

1. *Rareness of Elements present in an area on a national or state scale.*
2. *Excellence and completeness of Element occurrences found in an area.*
3. *Degree to which an area or its Element are threatened with incompatible use.*
4. *Degree of protection afforded similar Elements elsewhere in the landscape region.*
5. *The adequacy of representation of Elements in terms of genetic diversity.*

1985-86 SNA Long Range Plan

The 1985-86 update of the SNA Long Range Plan projected that Minnesota would need to establish a system of 500 natural areas by 2085 in order to adequately protect all elements of biological diversity in

the state. Of these, 200 sites were projected to be in the prairie biome, 135 in the deciduous forest biome, and 165 in the northern coniferous biome.

2008 Update to SNA Long Range Plan

In 2008, the Commissioner's Advisory Committee approved the following revisions to the Protection Objectives:

1. *To protect through SNA designation a minimum of three occurrences of each of the following elements: plants, animals, geological features, or other special features within each landscape region where they occur. Other occurrences may be registered.*
2. *To protect through SNA designation a minimum of five occurrences of each plant community element within each landscape region where they occur. Other occurrences may be registered.*

Long Range Budget Analysis

In 2010, in response to Legislative Direction, the Department prepared the *Long Range Budget Analysis of Land Management Need.* It called for land managing divisions in the DNR to project costs for managing current DNR lands, as well as for acquiring and managing lands over the next 10 years. The SNA projections in this report were based the two types of analysis listed in the excerpts below:

> *The SNA program targets acquisition and designation of Minnesota County Biological Survey (MCBS) mapped sites of outstanding and high biodiversity significance. If the program were to target, in the next 10 years, acquisition and protection of one percent of the already mapped unprotected outstanding and high biodiversity significance acres in all ecological sections (excluding the section containing the large peatland SNAs), the resulting total would be a SNA acquisition target of approximately 19,800 in the next 10 years. This 10-year total would equal an average of 1,980 acres acquisition and designation per year which compares to the FY06-10 average of 500 acres acquired per year.*
>
> *The SNA Long Range Plan identifies two types of SNA protection goals: number of sites to be protected as SNAs and number of occurrences of the state's natural features. To meet the long range plan goal of 500 SNAs by 2085, another 348 sites would need to be designated or about 5 sites per year. This report identifies a short-term target of acquiring 1% of the unprotected high and outstanding biodiversity significance acres or 1,980 acres/year over the next 10 years. Both the long range goal and short-term target are feasible, but dependent on availability of funding, staff and land acquisition opportunities, which are beyond the department's control.*

Protecting Minnesota's Natural Heritage

Biodiversity: Its Importance and Its Indicators

The Strategic Plan incorporates several concepts of biodiversity as a basis for conservation planning. This section addresses biodiversity, why it's important, and how it is used as a building block for this plan.

Definition and Importance

Biological diversity, or biodiversity, has been defined as the "the variety of life and its processes." A more detailed definition would further define it as "the variety of organisms, the genetic differences among them, the communities and ecosystems in which they occur, and the ecological and evolutionary processes that keep them functioning, yet ever changing and adapting," (Noss and Cooperrider 1994).

Minnesota's biodiversity has evolved over millennia into complex ecosystems composed of thousands of plant, animal and microbial species. Within each ecosystem, interactions among species are complex, and in many situations, not fully mapped and understood. The presence of one species may affect the survival of another species. For example, monarch butterflies are dependent on summer habitats, their wintering areas, and possibly habitats on their migratory route. Loss of grasslands and marshes that provide habitat for milkweeds will reduce food sources for monarchs. In Minnesota, monarchs are dependent milkweeds in our prairies, savannas, and wetlands. Each time a species is lost, the dice are rolled to see if and how an ecosystem can adapt to the loss. Resilience declines and functions and values of an ecosystem may be permanently compromised. According to The Nature Conservancy, the United States has lost over 271 species since the beginning of European settlement (The Nature Conservancy, 1992). This does not count invertebrates or nonvascular plants. While species extinction is part of natural evolution, the rate at which species are lost has greatly increased with the expansion of human settlement. The rate of loss has been estimated to be 400 times higher than the rate prior to human impacts (Wilson, 1992).

Losing species from ecosystems may affect their ability to provide ecosystem services that benefit agricultural, economic, and environmental functions. Examples are crop pollination, groundwater infiltration, surface water filtration, carbon sequestration, nutrient capture and recycling, air pollution filtration, and ambient temperature reduction.

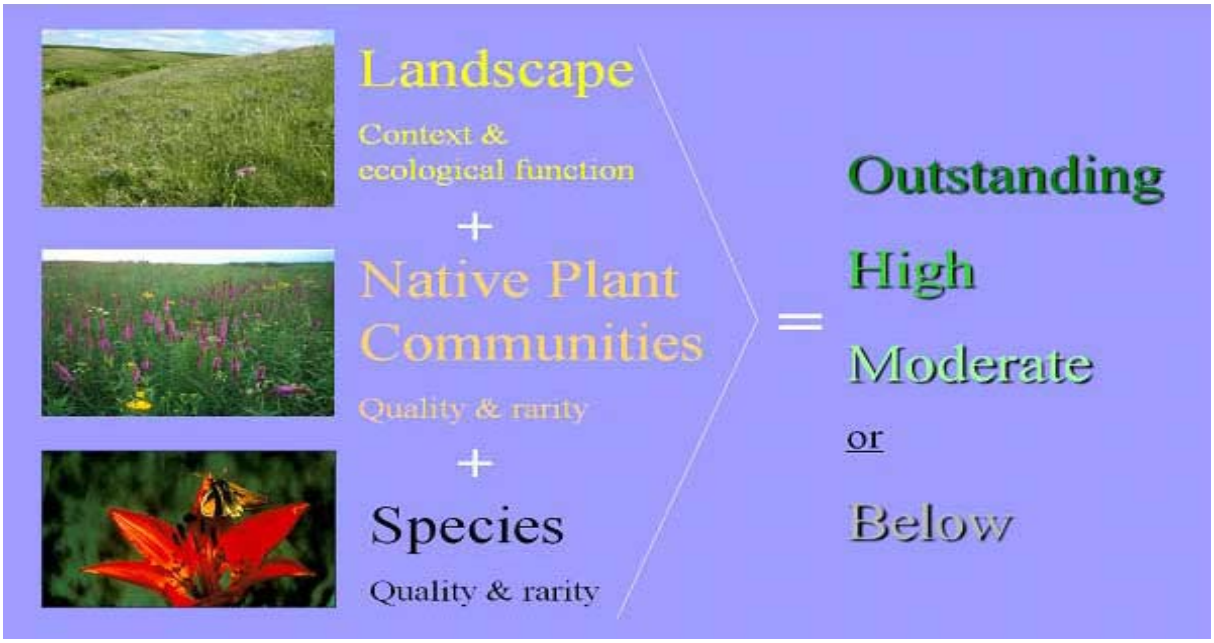
Not only is the loss of species a concern directly for the pure value of the loss, but the loss also creates a vacuum that opportunistic species may capitalize on and expand their presence. The concern is elevated if the opportunistic species is a non-native invasive. Ecosystems are under growing assault from invasive species. There are currently 4,300 invasive species in the United States (U.S. Fish and Wildlife Service), most of which are expanding their ranges into new habitats routinely. Maintaining healthy ecosystems and species composition reduces the chance for voids where invasive species may colonize, and the ecosystem maintains a higher degree of resilience.

Biodiversity decreases from habitat fragmentation or loss, conversion to agricultural and urban lands, degradation from invasive species, activities such as logging and grazing, and discharge of pollutants. As habitats become increasingly fragmented and smaller, the question arises regarding the minimum size that provides viability for plant communities. This Plan does not address the minimum size for each native plant community to be considered biologically viable. It does recognize that small patches of native plant communities may not function in the same capacity as larger ones, and simply capturing a small remnant may not fulfill the objective of protecting viable examples of native plant communities.

Minnesota Biological Survey: Definition of Biodiversity Significance

At the conclusion of work in a geographic region, Minnesota Biological Survey ecologists assign a biodiversity significance rank to each site they survey. These ranks are used to communicate the statewide native biological diversity significance of each site to natural resource professionals, state and local government officials, and the public. The biodiversity ranks help to guide conservation and management.

A site's biodiversity significance rank is based on the presence of rare species populations, the size and condition of native plant communities within the site, and the landscape context of the site (for example, whether the site is isolated in a landscape dominated by cropland or developed land, or whether it is connected or close to other areas with intact native plant communities).



As defined by the Biological Survey, there are four biodiversity significance ranks: outstanding, high, moderate, or below.

- "**Outstanding**" sites contain the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, and most ecologically intact or functional landscapes.

- **"High"** sites contain very good quality occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes.
- **"Moderate"** sites contain occurrences of rare species, moderately disturbed native plant communities, and/or landscapes that have strong potential for recovery of native plant communities and characteristic ecological processes.
- **"Below"** sites lack occurrences of rare species and natural features or do not meet MBS standards for outstanding, high, or moderate rank. These sites may include areas of conservation value at the local level, such as habitat for native plants and animals, corridors for animal movement, buffers surrounding higher-quality natural areas, areas with high potential for restoration of native habitat, or open space.

Sites of biodiversity significance mapped by the Biological Survey may contain high-quality native plant communities, rare plants, rare animals, and/or animal aggregations. Initially, the boundaries of these sites are determined by review of aerial photography based on native vegetation. In subsequent field investigations, ecologists assess the ecological characteristics of the site and the presence of rare species. Following field investigations, site boundaries sometimes are revised, or sites added, to incorporate critical habitat for rare plants and rare animals. In these instances, the quality of native plant communities is not the primary criterion for ranking the site.

The data mapped by the Minnesota Biological Survey generally reflect the condition of sites at the time of fieldwork in a region and have not been systematically updated to account for changes to the vegetation or species populations. The oldest data is of the western prairie region of Minnesota, where surveys began in 1987, followed by southeastern Minnesota and then the eastern Twin Cities metropolitan counties. Surveys are still underway in the northern part of the state. Areas not mapped as sites of statewide biodiversity significance include: (1) lands where native plant communities have been altered or destroyed by human activities such as farming, overgrazing, non-sustainable timber harvest, draining, invasive species, and development; and (2) occurrences of native plant communities that are too small to meet minimum size standards for mapping.

Vegetation (Native Plant Communities) as a Surrogate for Biodiversity

The Strategic Planning Team and its advisors have chosen to use inputs based on biodiversity indicators of existing native plant communities. While the presence of wildlife species and their habitat are also indicators of biodiversity, data for these factors are not consistently available. It is also relatively easy to describe, classify, and map. As such, it provides a useful, if simplistic, “surrogate” for habitats and the myriad of components of terrestrial biodiversity that are little known, poorly understood, or difficult to quantify.

This Plan uses native plant community data, biodiversity significance data, and state-ranked communities as a coarse filter to map broad areas of conservation importance. However, any depiction of vegetation is really only a temporal snapshot, and interpretations are limited by the quality of the data. Vegetation types and conditions may change as a community moves through natural succession toward climax conditions, or it may revert to a pioneering community due to natural disturbance such as fire or flooding, or from human activities.

Native Plant Communities

A native plant community is a group of native plants that interact with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms. These groups of native plant species form recognizable units, such as oak savannas, pine forests, or marshes, that tend to repeat over space and time. Native plant communities are classified and described by considering vegetation, hydrology, landforms, soils, and natural disturbance regimes. Examples of natural disturbances include wildfires, droughts, and floods.

Native plant communities are named for the characteristic plant species within them or for characteristic environmental features. Examples of native plant communities in Minnesota include dry barrens oak savanna, red pine-white pine forest, and bulrush marsh.

Many kinds of vegetated areas are not native plant communities. These include places where native species have largely been replaced by exotic or invasive species such as smooth brome grass, buckthorn, and purple loosestrife; and planted areas such as orchards, pine plantations, golf courses, and lawns. Other areas not considered to be native plant communities include areas where modern human activities such as farming, logging, and development have destroyed or greatly altered the vegetation.

Rare Species

When European explorers first visited Minnesota in the 17th and 18th centuries, they found a land rich in habitats, teeming with a diversity of plants and animals. Today some of the species seen by those early explorers no longer exist, or they survive only in small, fragmented populations. In an effort to prevent further losses, the state legislature passed Minnesota's Endangered and Threatened Species law in 1971.

The law directs the DNR to identify those species that are at greatest risk of disappearing from the state. By alerting resource managers and Minnesota's citizens to species in jeopardy, actions can be taken to help preserve the diversity of Minnesota's flora and fauna.

Rare Native Plant Communities

Native plant communities are classified by community type and by their relative rarity on a state and a global level. The more the imperiled the community, the lower the rank at a state (S) and global (G) scale, i.e. S1 communities are more imperiled than S2 communities. The status each community has is for scientific purposes only, and has no legal status for protection.

- S1: Critically imperiled statewide
- S2: Imperiled statewide
- S3: Rare or common statewide
- S4: Widespread, abundant, and apparently secure, but with cause for long-term concern
- S5: Demonstrably widespread, abundant and secure

S-ranks are separated by a slash (e.g. S1/S2) if more than one possible native plant community subtype with a unique S-rank is possible. Those with an S-rank of S1S2 or S2S3 indicate a community which may yet be classified as either of the two types because of uncertainty.

Ecological Evaluations

Ecological Evaluations are reports typically prepared by DNR ecologists. They highlight sites in Minnesota that contain rare natural features or that have outstanding examples of natural features that characterize a specific landscape or region of the state. Examples of these features range from large patterned peatland complexes, to native prairies, to places with populations of rare species (such as ram's-head lady's-slippers and red-shouldered hawks). These sites are sometimes large and intact enough that they continue to support important ecological processes such as regenerative wildfires, historic flooding regimes, and large-scale nutrient cycling and soil development. Other sites may be smaller, but possess exceptional examples of native plant communities or populations of rare plant or animal species. Their outstanding natural features make these sites the highest priority for conservation action, including ecologically based management planning, conservation easements, and recommendation as natural areas or parks. The Ecological Evaluations summarize the conservation actions most relevant for maintaining the important natural features of these sites.

Aquatic Resources

Aquatic resources include lake, river, stream, and deep-water/seasonally inundated wetland habitats and the species that occupy them. Aquatic resources have not been specifically addressed within State statutes for protection by the SNAs, as protection has been terrestrially focused.

That is not to say that SNAs have avoided aquatic habitats. SNAs have been acquired for desirable shoreline plant communities, entire lakes that house rare aquatic species, and regionally-sized areas of patterned peatlands that are underlain by water track systems.

Strategies for Protection of Biodiversity

Finding the resources to access, inventory, analyze, acquire and manage hundreds of plant community types and thousands of species will be daunting. Strategies developed in the last 20 years focus on using a “coarse filter” to capture the majority of conservation features that adequately conserve most native plant communities and 85–90 % of the species found in them. This approach has been used by conservation organizations such as The Nature Conservancy and state Natural Heritage Programs. A “fine filter” addresses those features that may be missed by a coarse filter. Typically these help develop policies or management actions on a species-specific level, and focus on species that are rare or threatened, endangered, or of special concern.

A coarse filter assessment is typically conducted for large regions using a gap analysis. The gap analysis is an inventory of how existing conservation lands and practices have captured and protected regional biodiversity. A gap analysis is usually done by overlaying conservation feature data (e.g. native plant community polygons) over existing conservation lands to see which features are protected on which lands. This process and its results for Minnesota native plant communities are discussed in the next section of this document.

At what scale does a missing species or native plant community become significant? A remnant stand of Big Woods may take on a greater significance at a local scale than when it is viewed regionally. However, that same stand of woods may take on a greater importance regionally when it is at the edge of its range of occurrence, or otherwise has the potential to include a genetic variation. However, if there are adequate occurrences of protection of this community variant within the region, then it may be less important.

Considerations in conservation planning typically go one of two directions: focusing on areas of high biodiversity, or focusing on habitats for rare or listed species. Interestingly enough, areas of high biodiversity are usually not a refuge for rare species. This is because rare species can frequently be specialists requiring very specific or unique habitats that are less well suited to housing a wide variety of species. Most conservation biologists favor maintaining representation of conservation features across their respective ranges, and by doing so, capturing a variety of genetic expression of those species.

Resilience as a Strategy

Conservation should promote practices that enhance ecosystem resilience to changes from climate change and fragmentation. Resilience refers to the capacity of a natural system to cope with profound disturbance such as the introduction of new species, fire, mowing, grazing, logging, erosion, sedimentation or impacts from a warming climate, and its ability to maintain the essential structure and functions operating in much the same manner as prior to the disturbance (However, some systems are adapted to and even dependent on regular disturbance created by fire or floods.). Resilient ecosystems maintain their biodiversity, have a greater capacity to recover from disturbance, have linkages across different biological scales, and are adaptable. As climate change affects ecosystems, and population growth increases the amount of land that is urbanized and cultivated, native ecosystems will face increasing vulnerability to the following conditions.

- Warming temperatures and increased evapotranspiration
- Less groundwater
- Increased frequency of extremes—storms, droughts:
    - increased wind or snow/ice damage
    - higher rainfall rates and increased runoff or flooding
    - increased erosion and sedimentation
- More invasive species—some promoted by warmer temperatures
- Greater pressure to be converted to cultivated or developed lands
- Increased fragmentation

One effective strategy at mitigating the impacts of climate change is to build resilience into native communities. This can be done by creating large areas or corridors that function in two ways to promote resilience: (1) to provide large pathways for species to migrate to cooler or more suitable climates and habitats, typically northward or eastward, (2) and to capture a greater variety of existing habitats that provide favorable locations for desirable species. Large areas reduce the perimeter to core ratio. Fewer perimeters will reduce the exposure of natural areas of being invaded by exotic species, particularly those invasive species that like edge conditions. Common buckthorn is a good example of a

species that is more likely to be found along the perimeter of forests than in the depths of the interior. By having larger tracts of forest, a smaller percentage becomes edge.

Minnesota Climate Change Vulnerability Assessment

The *Climate Change Vulnerability Assessment* completed in 2014 by the Minnesota DNR projects that Minnesota's climate will most likely change in the following ways.

- Warmer climate , particularly winter and nighttime temperatures. Warmer winter temperatures allow certain pathogenic species (pine bark beetles, emerald ash borer, Japanese beetle) to increase their presence which may increase mortality of native species.
- Climate translocations may shift north by 400 miles within 50 years, i.e. International Falls climate will be more like Albert Lea's, and Albert Lea's climate will be more like Kansas City's.
- Precipitation will increase across much of the state but will not keep up with net evapotranspiration increases. It will evaporate faster in a warmer climate, thereby reducing the affectivity.
- Precipitation will fall more erratically, with an increase in extreme rainfall events. More intense rainfalls are less likely to infiltrate to groundwater aquifers, will run off the landscape, and increasing flooding.

System Vulnerability

The vulnerability of different biological systems was mapped by a team of experts as part of the vulnerability assessment. The following potential vulnerabilities were identified.

Forest Systems

- High vulnerability (high potential impact combined with relatively low adaptive capacity): acidic peatland, forested rich peatland, and wet forest
- Moderate vulnerability: fire-dependent forest and mesic hardwood forest
- Low-to-moderate vulnerability (relatively low potential impact combined with moderately high adaptive capacity): floodplain Forest

Of the dozens of adaptation strategies considered for forest systems, the Assessment concluded that minimizing fragmentation and increasing connectivity is the single best approach for increasing the resilience of the different forest systems in Minnesota.

Aquatic Systems

Rivers & Streams

- Most vulnerable to changes in discharge/hydrology (base/peak flows, dams), water quality (nutrients & sediments), and geomorphology.
- Northern forest waterways more vulnerable to temperature increases than prairie systems.
- Trout streams in southeastern Minnesota have increased vulnerabilities to changes in temperature and turbidity.

- Flood frequency and peak flows will have the greatest impact on streams.

Depressional Wetlands

- Most vulnerable to changes in hydrologic regime, wetland system diversity, & nutrient loading

Upland and Wet (Brush) Prairies and "Surrogate" Grasslands

- Most vulnerable to habitat connectivity, invasive species, soil moisture, & agricultural cultivation

Lakes

- Lake systems will be affected by increased water temperatures, increased evapotranspiration, and reduced ice cover. Some impacts may include increased fish kills, greater variability in water levels, reduced water levels, increased nutrient cycling, reduced water quality, and vulnerability to land use changes.

General Impacts

- Fundamental shifts in habitat/ community distributions
- Prairie-Forest border may shift 300 miles NE during next century
- Forests in northeastern Minnesota may be replaced by savanna, brushland, or grassland
- Invasive species become more dominant

Goals, Objectives and Targets

Goals

Primary Goal:

The state's natural heritage is not lost from any ecological region of Minnesota.*

The state's natural heritage consists of the following.

- Plant and animal communities
- Rare species (including those listed as endangered, threatened, and special concern as well as Species in Greatest Conservation Need) and habitat that supports rare species
- Places of biodiversity significance
- Geological features/formations (including those that significantly illustrate geological processes, are of statewide significance, and include significant fossil remains)
- Other natural features of state or regional significance (including those illustrating succession of plant communities, relict flora or fauna persisting from an earlier period, and seasonal havens for wildlife)

The ecological regions of Minnesota are the twenty-four ecological subsections mapped through the Ecological Classification System.

**This Plan recognizes that with climate change, the natural landscape will change. Some species are likely to be extirpated from some areas. High quality, functioning natural communities today are likely to be the most resilient in the future, providing the greatest potential to sustain the state's natural heritage. These resilient natural communities are and will continue to be diverse, though the species composition may change over time. Natural communities may best persist when embedded within larger, interconnected areas of native and restored habitat.*

Secondary Goal:

The state SNA system provides the people with opportunities for scientific purposes and compatible nature-based recreation and education.

This goal is important in addressing SNAs role as units in the State Outdoor Recreation System. Lands designated as an SNA need to have public access. This goal also relates to the statutory criteria for SNAs being established as vantage points for observing concentrated populations of wildlife. Other aspects of addressing this goal are generally outside the scope of this Plan.

Objectives

1. Five occurrences of each existing native plant community are within designated SNAs within each ecological subsection.
2. Three occurrences of each existing species of plant and animal are within designated SNAs within each ecological subsection.
3. One of each type geological feature in the state is within a designated SNA.
4. Ten percent of the state's high priority conservation areas are protected through SNAs, (orange and red areas depicted on the Conservation Prioritization Results Map); other landowners and managers conserve the natural heritage within high priority conservation areas.
5. SNAs contribute ecological values in key watersheds.
6. The SNAs natural features and public benefit are sustained over time.

Strategies

1. Target SNAs to protect: (1) areas of greatest biodiversity significance, (2) high-ranked, rare native plant communities; with emphasis on protecting communities considered endangered and threatened in the state(S1-S2), and (3) habitat containing populations of rare (listed) species.
2. Increase the connectivity and/or size of SNAs to enhance ongoing viability and resiliency. Prioritize SNAs within larger scale interconnected areas of conservation lands and/or with SNAs that are larger in size (e.g. on average 400 acres in size).
3. Use the full range of approaches to establishing SNAs: a) designate SNAs on existing public lands (as secondary units on state lands, through transfer, and buying out school trust status when in the interest of the trust), b) acquire fee interest or conservation easement via purchase and gift, and c) explore establishing more SNAs through DNR leases.
4. Establish and manage SNAs to provide public access for compatible nature-based recreation and education.
5. Strive for establishing SNAs with reasonable management needs and the resources necessary to sustain the site's natural features and public benefits.

Priorities

Evaluate and prioritize candidate areas for SNA designation considering the following criteria from high to low priority.

A. The first protection of this resource within any state lands on a statewide basis:
   1. a state-ranked endangered or threatened (S1- or S2-ranked) native plant community
   2. a federally threatened or endangered rare feature
   3. a state threatened or endangered rare feature
   4. any native plant community
   5. any rare feature

B. The first protection of this resource within an SNA on a statewide basis:
   1. any native plant community
   2. any rare feature

C. The first protection of this resource within any state lands on an ecological subsection basis:
   1. any native plant community
   2. any rare feature

D. The second protection of resources listed under "A" within any state lands (or SNAs) on a statewide basis.

E. The second protection of resources listed under "A" within any state lands (or SNAs) on an ecological subsection basis.

F. Located within Highest Priority Conservation Areas.

G. Located within High Priority Conservation Areas.

H. Provide connectivity either between SNAs or between SNAs and other conservation areas.

NOTE: Areas that fulfill multiple objectives listed above are the highest priority, relative to the position on the list that the multiple objectives occupy. Also, sites that rate highest may not necessarily be appropriate or available as an SNA.

Targets

By the end of the 21st century (2099), the state aims to protect, approximately 300 SNAs statewide comprising about 325,000 acres (about 0.6 % of the state). This means designating 136,000 more acres of SNA over the next 85 years, or an average (mean) of 1,600 additional acres of SNA per year. This is based on establishing SNAs on about 10% of the high priority conservation areas across the state. This also assumes that the additional SNAs include lands already in state ownership.

Over the next twenty years, the target is to designate approximately 32,000 additional acres of SNAs with the following estimate of distribution across ecological provinces.

Table 3. SNA 20-Year Targets by Ecological Province

Province	20-year SNA designation target (acres)	20-year SNA designation target (%)
Tallgrass Aspen Parkland*	3,200	10%
Prairie Parkland	12,800	40%
Laurentian Mixed Forest	9,600	30%
Eastern Broadleaf Forest	6,400	20%
TOTAL	**32,000**	**100%**

Plan Approach

Minnesota is blessed with a great diversity of landscapes and habitats: from mixed-grass gravel prairies and saline wetlands in the southwest to the northern white cedar-yellow birch forests of the Arrowhead. As an example of the potential for changes in the ecological landscape, consider the rapid succession of plant communities from the Red River Valley due eastward to Lake Itasca. Prior to European settlement one started in the tall grass prairie, and within 30 miles traversed a landscape that progressed from grassland, to brush prairie to savanna, to dry oak forest, to mesic maple-basswood forest, to mixed conifer-hardwood forest, to finally a more boreal coniferous forest. The variation within this ecological continuum was facilitated by an elevation change of 700 feet, increased rainfall, and a change in soil type. It shows how rapidly very different plant communities can be closely juxtaposed. This may be a statement of the state's biodiversity, but it may also indicate how dynamic these systems are. Biomes can change quickly in short distances, and can be vulnerable to natural or human disturbance. Now these plant communities are much more fragmented due to farmland cultivation and urbanization. Pollen cores indicate that drier climatic periods have pushed the prairie and oak communities farther to the east in transitional areas like this.

Minnesota is also home to some varied geological landscapes. The state varies from being glaciated or untouched by glaciers, hilly to level, and from being underlain by sedimentary bedrock or metamorphic rock. Some of the oldest geological bedrock of the planet reaches the surface within the state.

The SNA Program must prioritize its efforts so that scarce funds are most efficiently utilized. It is important to develop a process that is based on science, is reproducible, and respected. In addition, the approach needs to employ a methodology that provides the most efficient solution for the Program to acquire the most important land for sustaining biodiversity with the least resources.

The SNA Program sought an approach embracing these characteristics in order to determine where SNAs are the most appropriate means of conservation. This approach is based on ecological resiliency explained starting on page 22.

Scales of Conservation

Statewide

The Plan's initial step is to identify statewide areas of prioritization that could efficiently preserve the state's range of biodiversity. These areas are of sizes of regional importance, but in rare instances may approach the size of a small county. The range of key landscape areas that will be captured, such as major river valleys or glacially-related landscapes, are best visualized when viewed at a statewide scale.

Regional

The next step would identify regional Conservation Opportunity Areas as high priority areas to focus the work of the SNA Program, its conservation partners, and local landowners and jurisdictions. These areas are not meant to be completely acquired for conservation, but help focus where individual site

acquisitions may occur. Concentrating efforts on fixed areas will result in more efficient protection of the state's natural heritage.

Local

Once individual sites have been identified, the Plan provides a method of evaluating candidate sites for their capacity to contribute to the entire conservation network and their appropriateness as an SNA. Sites are scored by the biodiversity, rare species, proximity to other conservation areas and priority areas, and other factors. The evaluation process provides a way to prioritize individual sites. Should sites score highly enough through the evaluation process, they can continue into the acquisition process, and be placed into a prioritization scheme with other qualifying candidate sites.

Gap Analysis

One of the first steps in conducting the conservation reserve system planning process is to analyze what is already protected by the existing conservation network. The best data layer to use for a statewide assessment needs to be determined, then what conservation features are most deficient in the protected lands and within the entire system statewide.

The primary resource type used in this analysis was the Native Plant Community (NPC) Classification generated by the Minnesota Biological Survey (MBS). This was selected at the request of the Commissioner's Advisory Committee, since it had some of the most comprehensive data at the highest resolution across the state. While the NPC data is subject to access to land, data and aerial photo interpretation, and is a subjective assessment, this data set is the most detailed with the greatest coverage. It is understood that MBS may have missed critical areas or NPCs within survey areas and that eight subsections in northern Minnesota have not been completed or only have preliminary data at the time of preparing this document. Therefore, this and future versions of the Strategic Plan will be seen as a living document that will be updated as MBS data become available for new areas and data are updated for already-surveyed areas.

The NPC data was entered into an assessment called a Gap Analysis. This type of analysis was conducted on a geographic basis using the 24 ECS subsections. All mapped NPCs were grouped by subsection. NPCs occurring within SNAs were selected and compared to NPCs that occur throughout the subsection on lands of all other ownership types. The same was done for NPCs that occur on all State, Federal or conservancy lands. By creating a master list of all NPCs occurring within a subsection and seeing how many of those NPCs are missing from SNAs, gaps in representation are identified. Likewise, gaps were determined in NPC representation for all public and conservancy lands. The minimum NPC acreage to be considered for representation is 0.1 acre. This removes NPC polygons that may not actually exist and are only artefacts from mapping. The minimum size was selected for documentation purposes and not for considerations of viability.

Results

Native Plant Communities Represented in SNAs

The first application of the results of the Gap Analysis was to assess the percentage of native plant community types captured by SNAs. For the subsections with mapped data, 16 to 41% of NPC types have are represented within SNAs, with a statewide ECS subsection average of approximately 28%.

The Ecological Classification System (ECS) subsections with the highest number of plant community types represented are the Red River Prairie and The Blufflands. This may be because the Red River Prairie has fewer types of NPCs within it, and therefore, it's easier to capture a broader representation of the subsection. Within The Blufflands, many areas are steeply rolling with abrupt changes in slope, orientation, and hydrology within any given parcel, particularly in valleys. The likelihood of a given parcel containing several types of NPCs is much higher due to the variations of the landscape. The

subsection with the lowest number of represented NPCs was the Mille Lacs Moraine; however this might be more of a reflection of missing data from Pine County. The next lowest was the Hardwood Hills subsection, which is a transitional area not only between prairie and forest, but also between northern and southern biomes. Therefore, the Hardwood Hills contains prairie, savanna, deciduous forest, coniferous forest, marsh, lakes, and woodland swamp/bog communities. The landscape has numerous hilly areas with many lakes and wetlands. However, quite a bit of the subsection is farmed, and a notable percentage is privately-held recreational land that may limit some of the public holdings in the subsection, particularly those adjacent to the many lakes in the area.

In addition, a list of NPCs not present within SNAs was created from the GAP Analysis. A separate list was created for NPCs without any representation within all DNR-administered lands (state parks, state forests and other forestry-administered lands, wildlife management areas, aquatic management areas, state recreation areas, SNAs), federal lands, and other conservancy ownerships such as the Nature Conservancy. Over 125 NPCs have no representation statewide within SNAs *within any subsection*. The spectrum of missing communities runs from wetlands and bogs to prairies, savannas, forests, and cliff plant communities. This list is provided within Appendix A.

How the Results Will Be Used

One of the important parts of completing the Gap Analysis was to provide a baseline of current NPC representation within SNAs. The baseline level of protection provided an input for use in the decision-support system the prioritization results, i.e. that the level of NPC representation in each ECS subsection is the basis for how much additional representation would be needed to achieve the conservation targets set forth.

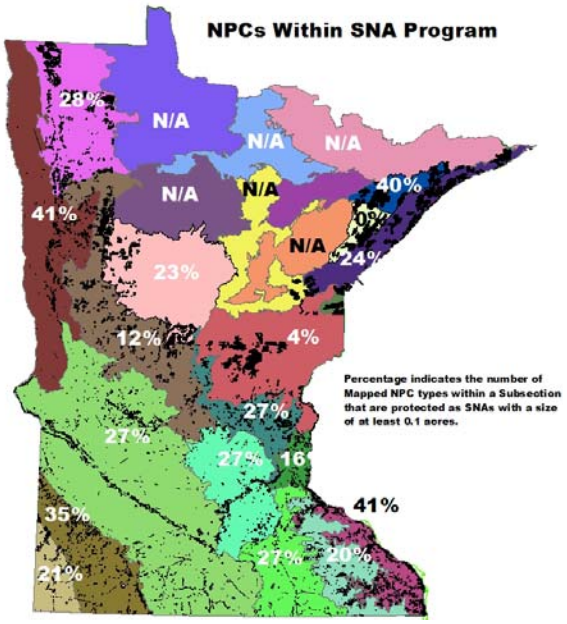


Figure 1. Native Plant Communities in SNAs

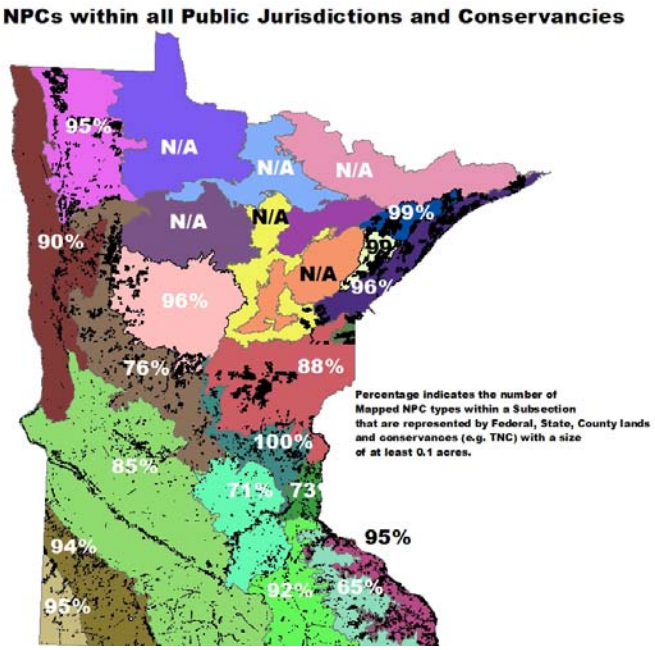


Figure 2. Native Plant Communities in State, Federal and Conservancy Lands

Incorporation into a Decision Support System

NPC averages for each ECS subsection were used as a baseline for determining additional protection necessary within each subsection. NPC types that are common and have a widespread presence within a subsection provide more options for selection than a NPC type that has very little presence anywhere within a subsection. With infrequent NPCs, the decision support system will have to select most if not all of the examples of a rare NPC type to meet the conservation targets. However, with a plentiful NPC type, the system can pick and choose which locations provide the most efficient solution with regard to the amount of land required, since it won't require all locations to meet its preservation target. Therefore, the Gap Analysis provides guidance about the selectivity requirements of how many sites are needed to meet conservation goals.

Incorporation into Candidate SNA Site Evaluation Guide

The most direct application of the results of the Gap Analysis is incorporation into the SNA Candidate Site Evaluation Guide explained starting on page 39. Candidate sites are scored by characteristics such as the occurrence of rare species, rare NPC types, biodiversity, or proximity to other conservation hotspots Candidate sites that protect an unrepresented NPC receive the higher score. Occurrence of a federally- or state-listed species in a site also receives the higher score. Sites that contribute an NPC type that has a limited ECS subsection presence, but has not met the objective of five examples of each NPC type receive a partial score. Appendix A provides a more detailed list of the occurrence of NPC types by subsections within SNAs, and within all state, federal and conservancy lands.

Decision Support System

Introduction

When planning a conservation network across a state as large as Minnesota, conservation actions must be prioritized. Otherwise the process could become overwhelmed by a sentiment of "where do I even start?" Prioritization may use ratings of ecological, economic, or geographic factors.

The data used needs to be comprehensive, reasonably current, relevant, and ranked to use as an input. A sound methodology also must provide reproducible results.

Decision Support tools

A Decision Support System (DSS) or Tool (DST) is a computer-based information system that supports planning or organizational decisions. DSSs are set up to serve the management, operations, and planning levels of a program or organization and help to make decisions. These systems can be either fully computerized, human or a combination of both. Software tools are also developed to assist in the decision process for computationally intensive analysis. They are categorized as data-driven or model-driven. A DSS is defined by these characteristics:

1. Tends to be aimed at problems that are less structured and underspecified, that upper level managers typically face.
2. Specifically focuses on features which make them easy to use in an interactive mode.
3. Emphasizes flexibility and adaptability to accommodate changes in the environment and the decision making approach of the user.
4. Is explicitly designed to solve ill-structured problems.
5. Is easy-to-use and has a powerful user interface.
6. Combines analytical models with data.
7. Explores the solution space by building alternatives.
8. Is capable of supporting a variety of decision-making styles.
9. Allows interactive and recursive problem-solving.

DSSs include knowledge-based systems. A properly designed DSS is an interactive software-based system intended to help decision makers compile useful information from a combination of raw data, documents, and personal knowledge, or business models to identify and solve problems and make decisions.

DSTs differ from models in that a DST provides the information in terms of a decision variable, which may be a parameter in relative terms (e.g. determining the optimal conservation locations capturing as many habitats as economically possible). This is different from computer models that provide output in terms of a technical variable, which may be a parameter in absolute terms (e.g. modeling specific groundwater impacts to habitats). Technical variables can be incorporated into a DSS.

The DST software programs investigated for possible use in this planning process included Zonation, ConsNet, Zonae Cogito, Marxan, Marxan with Zones, and CLUZ. Several were dismissed due to software incompatibilities with operating systems and the current version of GIS in use by the DNR. Other programs were better suited to address multi-goal conservation scenarios than simply prioritizing lands for the SNAs. These other DSTs can address conservation scenarios with different internal goals by creating zones which are used to determine qualitatively-ranked conservation use areas, e.g. areas best for logging, selective logging, or solely for preservation (no logging). Once the goals of the SNA Plan were finalized and it was determined that zones were not needed, it was decided that Marxan would be the DST of choice. This was based on Marxan's ability to process large amounts of data, respond to the amount of connectivity desired and then map the most efficient solution, and finally to find the optimal solution set for the least amount of opportunity cost (financial, economic, or social).

The Selection of Marxan

Marxan is the most widely-used decision support software for the design of conservation reserve systems in the world. Marxan has the ability to take primary input information such as the location of rare species, biodiversity areas, or mapped extent of different native plant communities and weigh against other types of information such as conservation constraints against the primary input. It then maps a result that provides the most efficient layout of a conservation system that addresses the primary conservation targets. Marxan has been used successfully in planning conservation reserves within entire countries, and regionally, such as in The Great Barrier Reef, Florida Keys, and the state of Florida. It was also used to prioritize actions within the Pennsylvania State Wildlife Action Plan (SWAP).

How Marxan Works

Marxan operates by creating hypothetical mapping solutions to see how well the areas mapped in each solution provide the most efficient means of creating a conservation reserve system. As applied to this plan, the software creates 300 scenarios using 160-acre cells across each ECS subsection in the state. A cell size of 160 acres was selected since it provides a reasonable level of resolution for a state-level plan and stays within the capacity of the computers processing very large amounts of data. It conducts iterative sampling via 1,000,000 iterations per scenario to create the optimal grouping of cells that efficiently capture enough locations of conservation features to meet the target level of conservation for each designated type of feature within the study area.

A target was set for each NPC type occurring within each subsection. An example would be a target value of capturing 75% of all calcareous fens within an ECS subsection. If a solution set does not meet this goal, it can be penalized, and Marxan will go through the remainder of the 1,000,000 iterations for that scenario trying to create a better solution that captures 75% of calcareous fens. The solution seeks to meet the conservation target and minimize the amount of land required to meet all of the other conservation targets (for other NPC types) also.

Other factors are also entered such as the following:

- Determining whether certain cells should be locked in or out, i.e. sometimes certain cells would always be included or excluded
- Areas that have low availability such as Prime and Unique Farmland soils (likely to be already farmed or have a high likelihood of being converted to farmland), contaminated sites, or School Trust Fund lands due to their high opportunity costs
- The degree to which cells should be grouped together to create small, discrete sites versus landscape corridors

When costs or opportunity costs are mentioned here, these are not literal costs that the State may pay, or a direct monetary cost to an industry that may also be considering utilization of the same land. Direct monetary values were avoided (such as tax valuation) due to their ability to skew the results. Instead, in keeping with a directive of biologically based inputs, costs were based on non-economic inputs. For example, Prime and Unique Farmland Soils were used as a cost layer in heavily agricultural sections of the state instead of land values. Land value data is generally only available at a resolution of civil townships (36 square mile blocks or greater), while soils data are mapped at a very fine resolution of 100 feet. Yet, using soils data does provide some indications of the economic implications of protecting land. Prime and Unique Farmland Soils are considered the most productive within the state, and are most likely already under cultivation or likely to be converted to cultivation. Typically, these soils have a higher market value since they are so productive and generate more crop revenue. Other data layers that were used in other parts of the state were land cover within the greater Twin Cities metropolitan area, and School Trust Fund lands within northeastern Minnesota. Land cover data was sorted by the amount of impervious surface, with those land cover types exceeding 4% impervious considered to be indicative of urbanization and high acquisition costs. However, this approach still allowed for the selection of conservation sites within urbanized areas, but typically little buffer would be selected due to its higher cost if the adjacent areas were urbanized. Likewise, in northeastern Minnesota, School Trust Fund Lands are dedicated as income-generating lands for school districts and are generally not suitable for use as an SNA, which would restrict uses such as logging or mining.

The Commissioner's Advisory Committee assisted with target-setting and input determination. One of the metrics that it determined was to not lock in or lock out cells. Locking cells in would always include those cells even if there might be a more efficient result without them. An example of a cell to consider locking in would be existing SNAs, as they are already part of the network. Locking cells out would always exclude those cells. An example of cells to lock out would be highways or areas of urban development that provide virtually no potential for important native habitat. By not locking cells a strictly biologically-based result is generated. By locking cells, the software may go to great lengths to include or exclude those cells at the expense of including other biologically important sites. Future work may test an alternative to this approach to exclude all SNA and other state, federal, and conservancy land so that acquisition opportunities are further highlighted outside of existing public lands.

Marxan will try to avoid selecting cells that have high opportunity costs even if they contain rare conservation features, as this will drive up the total "cost" of the solution set. However, some conservation features are so rare that all locations must be selected regardless of cost. Either these features may be included at the expense of other less costly features, or their costs are so high that the

selection will be very specific, resulting in virtually no areas peripheral to the conservation feature being selected that could function in a buffering or connecting capacity.

One of the most useful functions of Marxan is its ability to sort through different layers of inputs and constraints to generate results at a desired level of aggregation. Marxan also has a "clumping factor" input that allows the project to generate results with highly segregated priority areas, or to find the optimal way to create landscape-level "clumps" of conservation areas. The latter approach was selected as an adaptation strategy set forth in climate change assessments. This is explained starting on page 20.

Conservation Prioritization Results

The Marxan decision support system was used to create the Conservation Prioritization Results map (Figure 4) that rates the geographic areas that contain the state's range of biodiversity most efficiently. Please note that a very large portion of northern Minnesota has not been mapped yet. Minnesota Biological Survey is not complete in this region. Once entire subsections have been mapped, Marxan prioritization will be performed.

The mapped outputs from the Marxan areas of conservation priority are shown in Figure 4.

- dark green matrix = very low priority
- light green = low priority
- yellow = moderate priority
- orange = high priority
- red = highest priority
- white = MBS not complete; Marxan will be run when data are available.
- lavender = areas that have been surveyed and for which preliminary data will be forthcoming.

The high priority conservation areas (depicted in orange and red) were mapped in the following geographic areas:

- Glacial Agassiz Beach Ridges
- Agassiz Peatlands
- Minnesota River Valley
- Coteau des Prairie Escarpment
- Lower Mississippi River
- Lower Cannon Valley
- Whitewater Valley
- Upper Root River Valley
- Anoka Sand Plain
- Central sands and hills region
- Glacial Lakes of central Minnesota
- St. Croix River
- Nemadji Uplands
- North Shore of Lake Superior
- Arrowhead Highlands

The results have grouped together high priority areas for conservation at a landscape scale, giving a good indication of how corridors could be based on high priority core areas. These results correlate well with other plans and prioritization such as the Prairie Plan. The high priority cores give good guidance for considering sites that have conservation features warranting protection. It can later be determined whether any potential corridors or other conservation partners are within the scope of the SNA Program to procure.

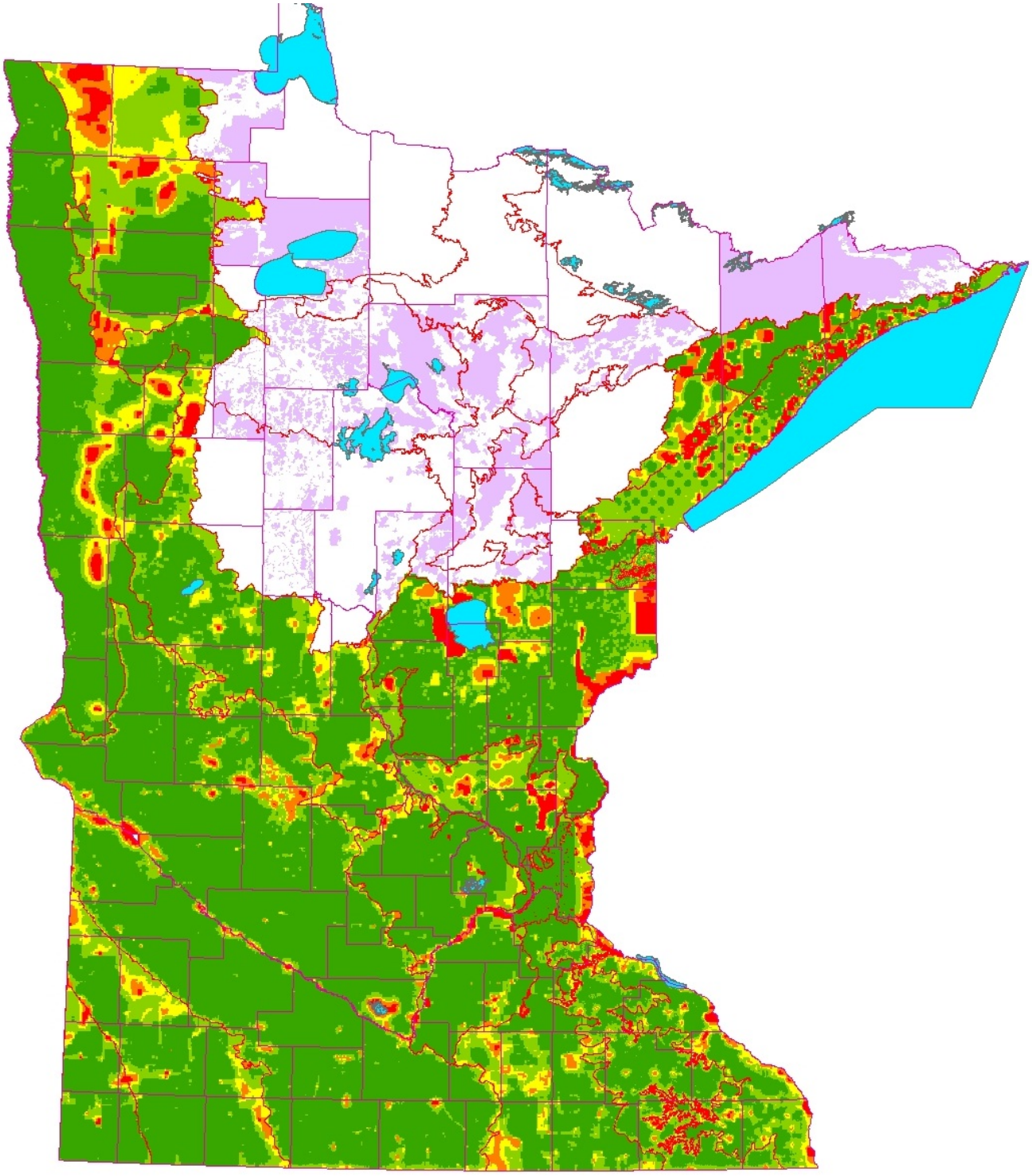


Figure 4. Conservation Prioritization Results

Conservation Opportunity Areas

Introduction

The Conservation Prioritization Map (Figure 4) is useful at a statewide scale for showing conservation needs across subsections, sections, and provinces. However, having a way to implement SNA conservation planning at a regional scale, and ultimately at a local level enables the on-the-ground implementation of the SNA Strategic Plan. This section will focus on the methodology chosen for regional implementation through Conservation Opportunity Areas (also referred to Opportunity Areas or Areas below).

Opportunity Areas are a way of further defining the Marxan high priority aggregations as discrete planning areas to focus for conservation efforts. These areas are selected for their capacity to provide the following:

- Significant rare resources, native communities, natural features, or biodiversity significance
- Partners that are willing to plan, implement, and evaluate conservation actions
- Conservation that is motivated by an agreed-upon conservation purpose and set of objectives
- Contributions to a conservation network that provides pathways for species mobility, which is particularly critical when addressing climate change concerns

Opportunity Areas were only developed for the ECS subsections that had complete MBS data coverage. These Opportunity Areas are detailed in Part 2 of the SNA Strategic Plan.

Sites possessing features worthy of SNA status would receive a higher level of consideration for acquisition if they are located within an Opportunity Area. Likewise, an Area can become a basis for seeking out and identifying opportunities that may exist so that a conservation network can be pursued instead of reactively purchased as land acquisition prospects arise.

It should be noted that while these Areas have special importance in conserving Minnesota's natural heritage, not all rare features or communities occur within this set of locations, and restricting conservation actions to these areas will not necessarily maintain viable populations of all species. *Nor is it the goal of the SNA Program to acquire all or even most of the territory circumscribed within each Area*. Opportunity Areas highlight where conservation actions should be focused.

During the review of the draft of this document, concerns were expressed about the intentions of the Opportunity Areas in that a greater amount of significance had been placed on their boundaries than was warranted. Since the objective is to capture significant conservation features that occur within the COAs, and not to acquire all land within COAs, the planning team initially believed that delineating COA boundaries was worthwhile. However, feedback from reviewers included concern that these boundaries implied acquisition areas in which all lands should be acquired for fee or easement. Therefore, the boundaries are muted.

Process

Initially, the boundaries of Conservation Opportunity Areas were drawn to capture the high and highest-priority areas (orange and red zones) from the Marxan output, and in many cases the moderate priority areas (yellow zones). This provided a base area for each Opportunity Area. Additional information layers were added to see how well the Marxan outputs protected rare or diverse conservation features, such as the National Land Cover Data set, the Element Occurrences of Natural Heritage rare features, Ecological Evaluations, and areas of biodiversity significance. Land cover was used as a layer to look at connectivity within high priority areas. This was particularly helpful in areas such as southeastern Minnesota, where strong landform patterns created by ridges and valleys can be used to provide connectivity. Ridges and floodplains are frequently cultivated, but valley side slopes also form a network that provides native forest or goat prairies that provide better species connectivity than cropped lands. Mapping workshops were held with a variety of DNR staff to refine the Opportunity Areas. In most regions, some boundary adjustments were made to include conservation features. Infrequently, an entirely new area was added and a few areas were removed.

Results

To date, 84 Conservation Opportunity Areas have been mapped within the 16 subsections where MBS data have been completed. Each of the 16 subsections has at least 3 Opportunity Areas. They range from 1,242 to 409,677 acres, with an average size of 85,655 acres or 133 square miles. Typically Opportunity Areas have a greater extent than the Marxan high priority areas, but it should be noted that the high priority areas were used to estimate future needs for the SNA Program.

Opportunity Areas were sometimes left deliberately unconnected to a neighboring Area if they had distinctly different geologies, landscapes, or major community types (e.g. peatland versus hardwood forest). Any particular Opportunity Area may contain diverse native plant communities. While these distinctions may be subtle in some cases, it allows for Opportunity Areas to be considered as a planning entity that addresses common concerns with regard to acquisition and management. Opportunity Areas were named using a dominant landscape feature. Naming them reinforces an identity that may be helpful in building community support and generating partnerships.

The Opportunity Areas closely approximate the High- and Highest Priority Areas explained on page 34, and therefore align closely with core areas identified in planning efforts, such as the Minnesota Prairie Conservation Plan. They are clustered around critical Minnesota landscapes such as the Glacial Beach Ridges and the Minnesota River Valley. Figure 5 illustrates the location of the Conservation Opportunity Areas and their relationship to the Marxan high priority areas.

Implementation

Each year, efforts will be initiated to identify and pursue important sites within a handful of the Conservation Opportunity Areas (COA). Using the COA descriptions in Part 2 of this Plan, SNA staff and partners will engage local governments and groups in targeted COAs to identify the best candidates as

potential SNAs. Landowners and land administrators will be approached to ascertain their interest. In many COAs, this process of engagement and cultivating interested landowners/manager is something that is developed methodically and respectfully.

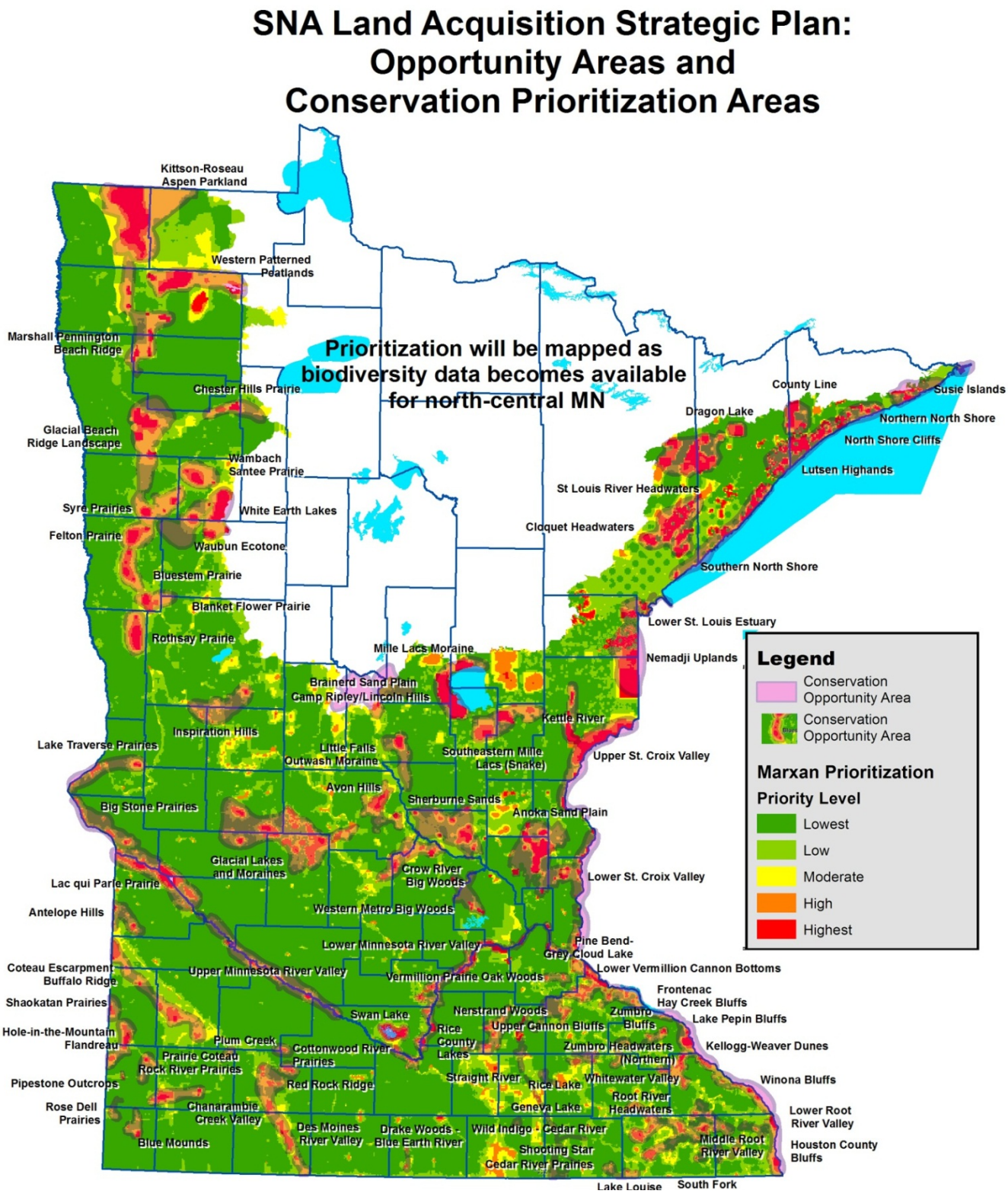


Figure 5. Opportunity Areas and Conservation Prioritization Results

SNA Candidate Site Evaluation Guide

Individual sites will be evaluated through a finer filter using the SNA Candidate Site Evaluation Guide, developed at part of this Plan. To make parcel decisions, a number of site-specific factors need to be reviewed, evaluated, and scored systematically. This could not be done at a landscape scale, though the landscape scale analysis and planning are incorporated into the evaluation of each candidate site. It is not within the scope of this document to evaluate individual candidate sites. The SNA Candidate Site Evaluation Guide (also called the Site Evaluation Guide) will provide a finer level of prioritization that may be particularly useful when determining how funds should be allocated.

To be considered, the site needs public access, a landowner willing to sell, and an Ecological Evaluation that recommends designating as an SNA. Once it has met these three initial criteria, additional factors are evaluated with the guide.

Each of six metrics (as described below) awards full or partial scores based on the site's characteristics and how well the site meets the requirements of that metric. Each metric may award a maximum of 15 or 20 points, with a minimum of 0 points. Six classification levels are provided to guide the reviewer in scoring of the site. The matrix was designed to have a maximum score of 100. The guide was "beta-tested" on a number of known sites by several evaluators. While some minor variations in total scores occurred, in general, site scores were consistent and results differentiated higher priority candidates. Very few sites scored higher than 80 points. This was still useful, so that only a very few sites of extreme biological and/or geological importance would stand out from other sites that are worthy of designation. Most sites achieved scores between 60 and 80 points that are under consideration for acquisition. Sites between 50 and 60 points are considered of marginal importance, and would need a compelling reason to continue consideration. Sites below 50 points are generally not pursued further. The lowest site score was 30 points.

A copy of the Site Evaluation Guide is included in Figure 6.

Metric 1: Diversity and quality of native habitat

Parcel score: up to 20 points. This metric evaluates a site's contribution to the Subsection's biodiversity. Sites receive a high score if they contain an area of Outstanding Biodiversity Significance, or the majority of the site has B-ranked or higher element occurrence ranking. Sites receive progressively lesser scores until a site only has D-ranked communities, or only has "below threshold" biodiversity significance. While this metric is focused exclusively on biodiversity, some concern may exist that biodiversity is already factored in as a primary input of Marxan. However, a number of other inputs are made into Marxan that generates a mapped output that incorporates aggregation factors and opportunity costs to find an optimal way to group conservation areas, which is different than solely using biodiversity data. Also, not only is biodiversity important at a landscape scale, it is a strong indicator of value at a parcel level.

Metric 2: Habitat for rare species and under-protected plant communities

Parcel score: up to 20 points. This metric Addresses species that are federally or state threatened or endangered. The documented presence of listed species at a candidate site qualifies for the highest scoring, as does the site with a native plant community that is missing from other SNA holdings within the Subsection. The next most important ranking would be for habitat for a federally-listed species, regardless of whether the species is present. Other factors that would provide this level or ranking would be sites with priority habitat or key habitat as identified by the State Wildlife Action Plan. Sites that provide an additional occurrence of a rare species or a native plant community (toward meeting the objectives of 3 occurrences of each species and five of each plant community per ECS subsection) also qualify for the second highest scoring category. Sites with species of Special Concern qualify for the third category. And finally, abutting properties with any listed species or five Species in Greatest Conservation Need qualify the candidate site for the category providing the lowest ratings.

Metric 3: Size

Parcel score: up to 15 points. This metric considers the size of the parcel and the sizes of the native plant communities occurring within it. If the parcel is large, or the plant community area is significant for that type of plant community, the site warrants a highly-ranked score. Moderately sized parcels or native plant communities receive a moderate score.

Metric 4: Location and connectivity

Parcel Score: up to 15 points. This metric considers proximity to other areas. Candidate sites are superimposed on the Conservation Prioritization Map and the core and corridor areas from the Minnesota Prairie Conservation Plan to assess their proximity to these conservation areas. If a site is located within a red or orange Marxan zone, or within a Core area of the Prairie Plan, it would receive the highest score. If a site abuts another conservancy land or is within a Prairie Plan corridor it would receive the next highest score, as it would provide connectivity to other conservation lands. Sites within a yellow prioritization Marxan area would receive a medium ranking, and as sites became more distant from Marxan or Prairie Plan priority areas they would receive diminishing points up to a distance of 10 miles, at which distance no points would be awarded.

Metric 5: Management needs

Parcel Score: up to 15 points. This metric addresses the extent to which the parcel helps the SNA Program in addressing habitat and property management. Sites that currently have no or minimal invasive species management needs would score the highest, as would sites that provide access and connectivity for management for existing conservation areas. Connectivity is important for management activities as it allows for a singular effort that covers a broader area. This is particularly helpful for conducting prairie burns, reducing exposure to invasive species from edge effect, and reducing potential impacts from management actions to off-site properties. As a parcel requires greater or long-term efforts to eradicate invasive species already present, remove buildings, wells, debris, or

other structures, or significant reconstruction of native plant communities, the scoring may be reduced to zero.

Metric 6: Additional factors

Parcel Score: up to 15 points. This metric addresses factors that warrant consideration that may not apply to every site, or are less easily grouped into a metric of its own. The first is whether the parcel is in jeopardy through acquisition by another party, or of development—particularly if it contains high ranking native plant communities. If the site is in a region experiencing the development of sand, gravel, or mineral mines, rapid urbanization, or conversion to cropland, the site may warrant awarding additional points to increase its score. In addition, a site may receive points for containing geological features of statewide significance, or has a landowner that is willing to donate a large portion of the site to the SNA Program.

Minnesota Scientific & Natural Areas

SNA CANDIDATE SITE EVALUATION GUIDE

For internal planning process, to determine whether to buy a particular ownership

Maximum score: 100 pts.

Criteria for each point award are met by meeting just one threshold, e.g. all of the three criteria for Occurrence of suitable habitat do not need to be met to obtain the 15-point award for that Evaluation Factor.

Initial Criteria: (all 3 should be answered with "yes" before proceeding)	Yes	No	In process	
Has the parcel received an Ecological Evaluation recommending site as SNA?	☐	☐	☐	Date EE completed_____ Is a new EE needed? _____
Is public access available to the site? (side borders a public road, or legal access to the site accompanies the deed)	☐	☐	☐	
Is the landowner willing to consider selling?	☐	☐		

Note: Parcels nominated solely for their geological features are not evaluated with this form

Evaluation factors:	Points awarded for meeting criteria: 20-16 points	15-11 points	10-6 points	5-4 points	3-1 points	0 points
Diversity and quality of the native habitat contained in the parcel (based on DNR Natural Heritage Database, MN Biological Survey or MBS or Regional Ecologist update) (20 pt. maximum)	• More than half of the site acres consist of a natural community with an A, B, AB, or BC element occurrence (EO) ranking. • All of the parcel is identified as MBS site of Outstanding Biodiversity Significance.	• About half of the site acres consist of C-ranked community, and the rest is ranked higher than C (EO) ranking. • Part of parcel identified as MBS site of Outstanding Biodiversity Significance • Parcel or part of parcel identified as MBS site of High Biodiversity Significance. • The parcel includes one or more "lakes of biodiversity significance" as identified by MBS	• About half of the parcel acres are composed of C-ranked native plant communities, the rest is D-ranked or lower. • All of parcel identified as Moderate Biodiversity significance or higher	• About half of the parcel acres are composed of C-ranked native plant communities, the rest is D-ranked or lower. • Part of parcel identified as Moderate Biodiversity Significance, the rest of parcel lower than "moderate".	• Less than 50% of the parcel is C-ranked native communities, and rest is ranked lower than C	• The only native community present on parcel has a D ranking • All of site is ranked "below threshold" for biodiversity significance
Occurrence of, or suitable habitat for rare species within the parcel OR Occurrence of NPCs missing from SNA program objective (20 pt. maximum)	• Presence of a federally listed species; and/or presence of one or more state endangered or threatened species occurrences (these state E or T species must have A, B or BC ranking). • Presence of a native plant community or EO that is not already protected by an SNA in the ecological subsection, as identified by the gap analysis.	• Presence of habitat for a federally listed species that it would reasonably be expected to use (big enough for its territory, enough food for it, neighboring lands harbor it). • An unranked occurrence of a state endangered or threatened species. • Site includes a "key habitat" as determined by Tomorrow's Habitat for the Wild and Rare: Minnesota's Comprehensive Wildlife Conservation Strategy • Helps to meet the SNA goal of 3 EOs and 5 NPCs per ecological subsection – as identified in the gap analysis.	• Presence of one or more special concern species with any ranking (A through none).	• Presence of one or more listed or special concern species (with any ranking) on nearby properties. • 5 or more Species of Greatest Conservation Need (SGCN) for the subsection where the parcel is located, as determined by Tomorrow's Habitat for the Wild and Rare: Minnesota's Comprehensive Wildlife Conservation Strategy		• No rare species seen on parcel or within 2 miles • The SNAs in the subsection where the parcel is located already protect 3 examples of each EO and 5 examples of each NPC found on this parcel.
Size of parcel (15 pt. maximum)		• NPC is significant in size for this NPC type, and in this ECS subsection. • While each NPC is of moderate size for the NPC type, the ownership parcel is large for the area.	• Moderately-sized remnant relative to other comparable communities in the ECS subsection			• Small community remnant relative to other examples in the area.
Location of the parcel in relation to other biodiversity hot spots and/or conservation land (15 pt. maximum)		• Parcel is in a high priority (red or orange) area of the Marxan prioritization mapping, and/or is projected to be in a Marxan high priority area when MBS data are complete. • Located in a MN Prairie Plan Core Area (list which one).	• Parcel is in a Prairie Plan Corridor • Parcel is near or adjacent other permanently protected conservation lands with intact habitat.	• Parcel is in a yellow zone of the Marxan prioritization mapping • Isolated parcel: Other habitat or conservation lands within 2 miles	• Isolate parcel within 5 miles of a red, orange, yellow Marxan zone • Prairie within the agricultural matrix (not in a Prairie Plan Core or Corridor) but protecting it would protect significant water resources.	• Isolated parcel greater than 10 miles from a red, orange or yellow Marxan prioritization mapping zone.
Potential for long-term habitat management and enhancement of the parcel (15 pt. maximum)		• SNA ownership of this parcel would improve management options for a larger, contiguous area (e.g. improves ability for prescribed fire mgmt, invasive species control, better coordination with conservation partners).	• Parcel has no major limitations to management (has good access to all parts that might require management) • Parcel does not require significant management efforts (minimal invasive issues, no reconstruction, no building removal needed no expectation of heavy use, no proposed trail, etc..)	• Parcel has some major limitations to management. (may have a building, some invasives, junk piles, etc)	• Parcel has significant limitations to management (e.g. surrounding residential development limits Rx fire, exotic weed control issues, canopy community decimated and signs that understory is in peril). • Up to 50% of parcel requires heavy management or restoration	• Restoration and invasive species removal requires multiple efforts over the majority of the parcel. • Expensive and time consuming plant community reconstruction required.
Additional factors (included in the evaluation as appropriate) (15 pt. maximum)		• Jeopardy of parcel: e.g. parcel is in an area where this type of property is experiencing strong development pressure due to gravel mining, cropland conversion, housing, or other imminent threats AND parcel contains S1 or S2 ranked communities or T and E species • Landowner is willing to donate significant acreage of parcel • Parcel has geological features of statewide significance	• Jeopardy of parcel: e.g. parcel is in an area where this type of property is experiencing development pressure due to gravel mining, cropland conversion, housing, or other imminent threats	• Parcel provides good cross-section of geological strata or fossil exposure		

Overall summary of the parcel's priority for enrollment based on the evaluation criteria. Writing a succinct summary statement here is very helpful as this statement can be used repeatedly for the fact sheet as well as for future LCCMR, LSOHC, Bonding etc. reports.

Figure 6, SNA Candidate Site Evaluation Guide

Related Planning Efforts

Conservation of Minnesota's natural areas and natural heritage are addressed in a number of other plans. This Plan has identified several efforts directly related to the SNA Strategic Land Protection Plan (SNA Strategic Plan). These plans reinforce each other and will help lead to cooperative conservation of natural areas. The Minnesota Climate Change Vulnerability Assessment is explained in starting on page 21. The plans or planning initiatives discussed below are:

- Statewide Conservation and Preservation Plan
- Minnesota Prairie Conservation Plan
- Strategic Conservation Agenda
- Conservation that Works
- State Wildlife Action Plan
- Strategic Land Asset Management

Statewide Conservation and Preservation Plan

The *Statewide Conservation and Preservation Plan (*SCPP) (2008) is an integrated inventory and assessment of Minnesota's environment and natural resources. It helps guide decision-makers on future short and long term planning, policy, and funding investment. The Legislative-Citizens Commission on Minnesota Resources (LCCMR) commissioned the University of Minnesota's Institute on the Environment to prepare the SCPP. The SCPP contains recommendations in four categories: habitat, land use, transportation, and energy. The Habitat section contains 13 recommendations. Of particular interest are Recommendation *1: Protect priority land habitats;* and Recommendation *3: Improve connectivity and access to outdoor recreation.*

The SCPP prioritizes geographic areas across the state for conservation and preservation. It states:

> *Conservation and protection of these land areas will require multiple mechanisms and a coordinated effort among local, county, regional, state, and national public agencies; nonprofits; and private entities. Of particular importance are rare land features and areas such as native prairie and savanna …*
>
> *Focus protection on the critical lands the SCPP has identified by township (Figure H16). Within most highly ranked townships, use detailed analysis to identify specific land parcels for purchase, for development of permanent easements … (probable range: <1% to 3% of additional Minnesota land). High-priority examples include native prairie, savanna, old-growth forest, and areas that add to or provide linkages between large, intact ecosystems.*
>
> (pp. 63 & 66, *Statewide Conservation and Preservation Plan*, 2008).

The SCPP integrated 12 weighted sets of geographic data on land use and resources, including biodiversity significance, potential species richness, road and housing density, etc., to develop a statewide "Integrated Terrestrial Value Score" map rating each township in the state.

Under Recommendation 3: Improve connectivity and access to outdoor recreation, the SCPP states:

> *Action should be taken to improve connectivity of and access to outdoor recreation areas (parks, natural areas, wildlife management areas, etc. …*
>
> *Prioritization for acquisition, protection, and restoration of the natural resource base that supports outdoor recreation should focus on large, contiguous land areas suitable for: natural resource-based outdoor recreation; shorelands; threatened habitat areas with opportunities to improve connectivity to underserved areas; …*
>
> *(pp. 74 & 76, Statewide Conservation and Preservation Plan, 2008).*

Implications for the SNA Strategic Plan

These statements of emphasis within the Statewide Conservation and Preservation Plan are consistent with the approach advocated in the SNA Strategic Plan. Furthermore, the two maps (below) from the SCPP (which have reverse coloring from each other) warrant comparison. In particular, the resulting pattern of highly scored areas on the "Integrated Terrestrial Value Score" map on the left correlates with the Conservation Prioritization Map in the SNA Plan.

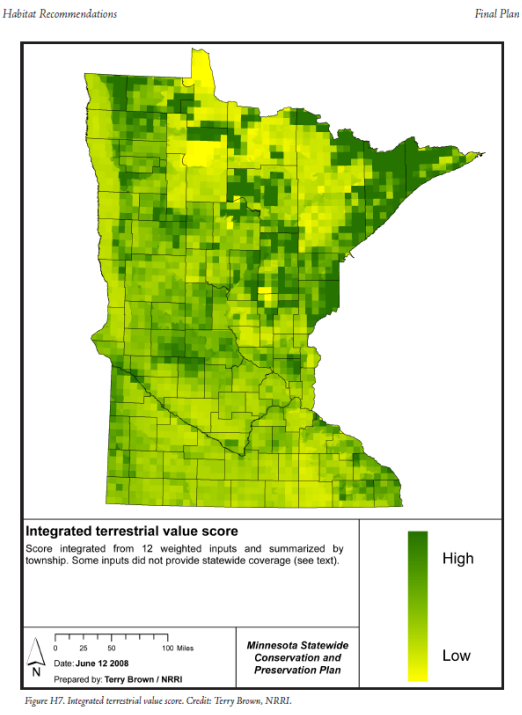


Figure H7. Integrated terrestrial value score. Credit: Terry Brown, NRRI.

Figure 7. SCPP H7. Integrated Terrestrial Value Score

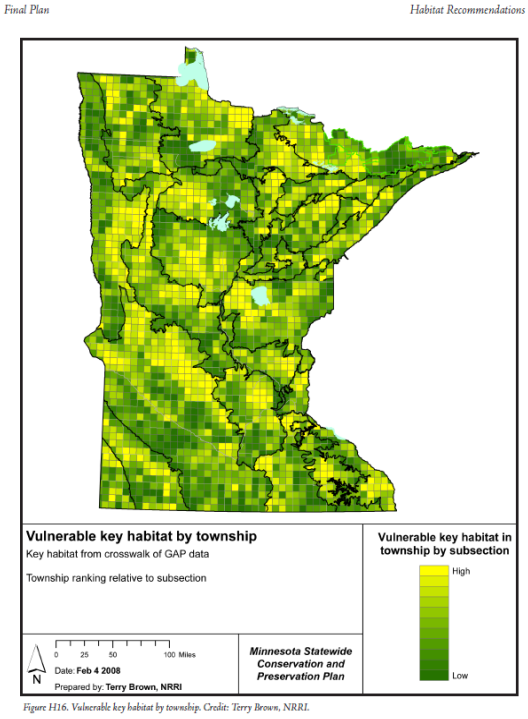


Figure H16. Vulnerable key habitat by township. Credit: Terry Brown, NRRI.

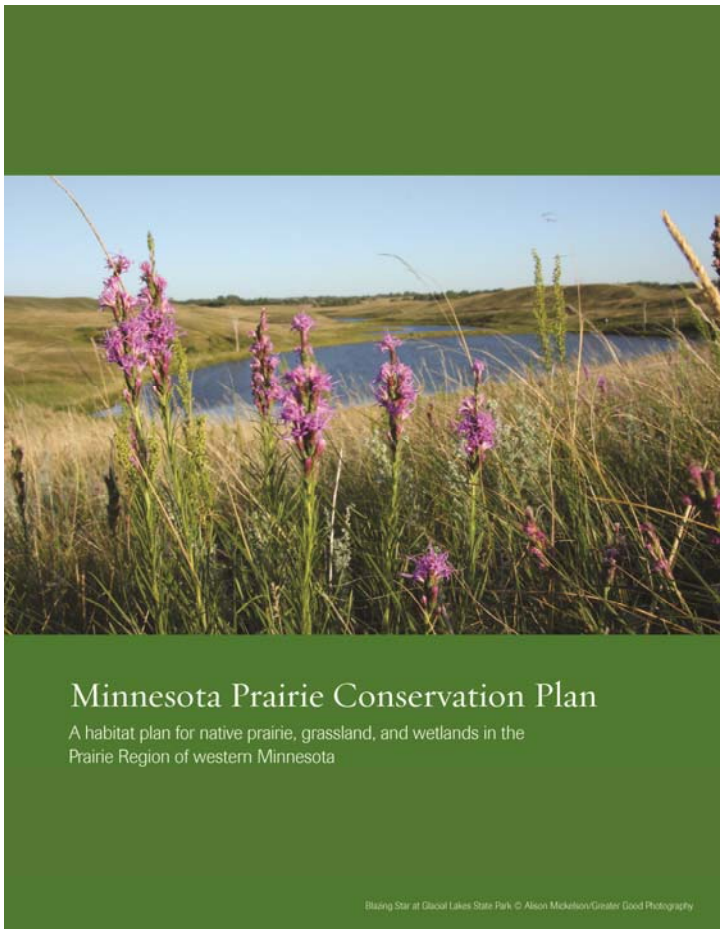
Figure 8. SCPP H16. Vulnerable Key Habitat by Township

Minnesota Prairie Conservation Plan

The *Minnesota Prairie Conservation Plan* (Prairie Plan) was a multiagency collaborative effort among the DNR, MN Board of Water and Soil Resources, The Nature Conservancy, U.S. Fish and Wildlife Service, MN Prairie Chicken Society, Pheasants Forever, and The Conservation Fund. These conservation partners in the Prairie Region of the state collaborated to develop a twenty-five year strategy for accelerating prairie, grassland and wetland conservation. This strategy was precipitated by several factors:

1. Continuing loss and degradation of prairies, grasslands, wetlands and associated habitats along with the fish and wildlife dependent upon them.
2. An acknowledged need to better coordinate between programs and organizations to maximize efficiency.
3. Tremendous opportunities provided by the passage of the Clean Water, Land and Legacy Amendment by voters in 2008 that will provide significant conservation funding through 2034.

The Prairie Plan calls for three approaches to conservation in the Prairie Region of the state. First, core areas with a high concentration of native prairie, other grasslands, wetlands, and shallow lakes were identified. Within these core areas, partners will work to ensure a minimum of 40% grassland and 20% wetland with the remainder in cropland or other uses. Second, habitat corridors connecting core areas were designed that include grassland/wetland complexes nine square miles in size at about six mile intervals along and within the corridors. Within the corridor complexes a goal of 40% grassland and 20% wetland was set. For the remainder of the corridors 10% of each legal land section is to be maintained in permanent perennial cover. Third, in the remainder of the Prairie Region a goal to maintain 10% of each Land Type Association in perennial native vegetation was established.



The existing wildlife management area plan, plans targeted at pheasant and ducks, and other resource plans provided guidance in setting goals for protection, restoration and enhancement in each conservation approach. The Prairie Plan is an umbrella plan that draws from these program and species plans, but does not replace them.

Based on this framework and background, the Prairie Plan proposed the following:

1. Permanent protection through the acquisition from willing sellers of fee title or easement of native prairies, wetlands and other habitats (including land to be restored): about 222,100 acres in core areas, 82,000 acres in corridors, and 547,300 acres elsewhere.
2. Restoration activities in grasslands, wetlands and other habitats: 180,900 acres in core areas, 84,100 acres in corridors, and 251,000 acres elsewhere.
3. Enhancement of prairies and grasslands via prescribed fire, conservation grazing, haying and invasive species control: 100,560 acres annually in core areas, 42,050 acres annually in corridors, and 334,397 acres elsewhere. Enhancement of 335,047 acres of existing wetlands and shallow lakes through control of invasive species and intensive water level management is also included.
4. Incorporation of conservation into "working lands" so that some conservation lands contribute directly to local economies via "grass-based" agriculture and agricultural lands in turn provide some natural resource benefits as a result of using the full range of conservation practices.

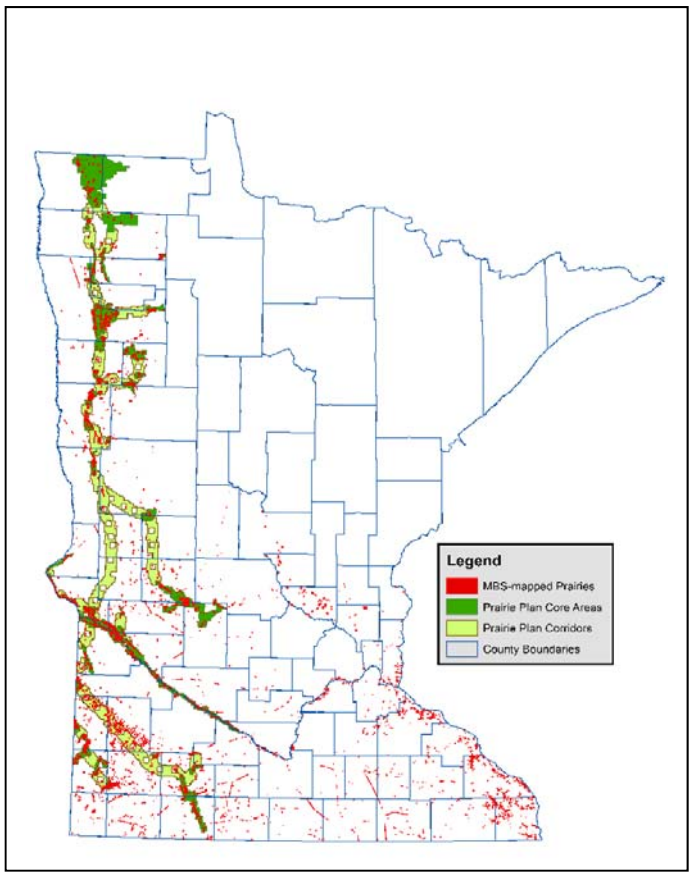


Figure 9. Prairie Plan Core Areas and Corridors

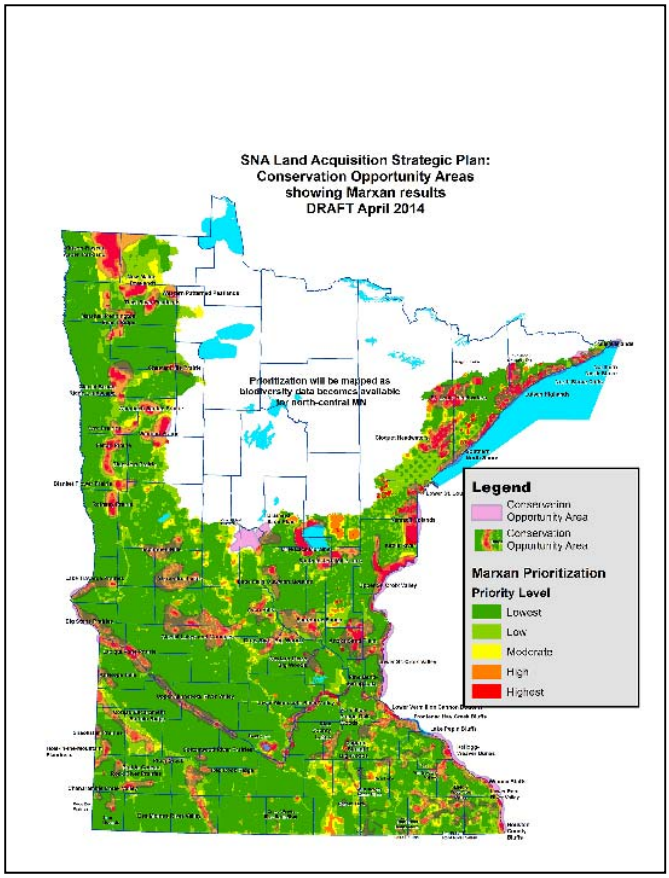


Figure 10. Conservation Opportunity Areas

Implications for the SNA Strategic Plan

The Prairie Plan has set conservation targets for upland prairie, wet prairie, brush prairie, savanna, and wetlands. However, while it promotes the conservation of all native plant communities within the Prairie Province, it has not set specific conservation goals for other woodlands, forests, or wetlands, nor has it mapped prioritization areas for those landscapes. In comparison, the SNA Strategic Plan has prioritized areas based on their biodiversity significance regardless of whether they are prairie, forest, or wetland. Therefore the SNA Plan identified more areas than the Prairie Plan does.

However, even though the SNA Plan addresses non-grassland biomes, the priority areas identified in both plans are strongly correlated. The Prairie Plan established Core Areas and Corridors that prioritized the same geographic areas that the SNA Plan's Conservation Prioritization Map identified. Areas such as the Coteau Escarpment, Minnesota River Valley, Glacial Beach Ridges of the Red River Valley, and the Aspen Parklands of eastern Kittson County are present in both plans.

Since both plans have closely-aligned results and recommendations, partnering opportunities are greater for both efforts. The SNA Program is actively participating in implementing the Prairie Plan through its Local Technical Teams. Furthermore, the SNA Program already has a strong partnership with The Nature Conservancy (TNC), and many sites are protected through the combined efforts. In addition, TNC has utilized SNA's Conservation Prioritization Map (Marxan) and Conservation Opportunity Areas as part of its long-range planning.

DNR's Strategic Conservation Agenda and Conservation That Works

The DNR *Strategic Conservation Agenda* provides a foundation for communicating three trends that shape DNR's mission and conservation strategies. It also described 83 performance indicators and conservation targets DNR uses to measure and communicate progress. Specifically, the number of sites protected in SNAs is one of its Natural Lands indicators.

Conservation that Works (CTW) is the DNR Senior Managers strategic priorities and goals that complements the *Strategic Conservation Agenda*. Version 2 of CTW describes the four goals and major strategies to be implemented between 2011 and 2014. The first two goals most directly support habitat conservation under the state Outdoor Recreation System.

> *Goal 1. Minnesota's waters, natural lands, and diverse fish and wildlife habitats will be conserved and enhanced.* Strategies include the following:
>
> - *accelerate and better target prairie landscape conservation*
> - *strategically conserve forests and improve forest planning processes*
> - *adapt programs to respond to changing climate …*
>
> *Goal 2. Minnesota's outdoor recreation opportunities meet the needs of new and existing participants so that all feel connected to nature.*

Implications for the SNA Strategic Plan

Continuing SNAs as key indicator of conserving natural lands is in line with the SNA Plan. Consideration could be given to measuring acres rather than numbers of sites in SNA as a better indicator of progress. This is particularly true given more emphasis on fewer, larger SNAs.

CTW's Goal 1 clearly gives priority to protection of natural lands through SNAs and other Programs. While strategies refer to both prairie and forest, together with the Prairie Plan, near term emphasis for new land protection efforts is on the prairie. The SNA Plan's inclusion of climate change and resiliency meshes with the departmental strategy. Regarding CTW's Goal 2, as part of the Outdoor Recreation System, SNAs clearly strive to connect people to nature. While not within the scope of this Plan, specific strategies are engaging more people with SNAs.

Strategic Land Asset Management

The DNR has initiated Strategic Land Asset Management (SLAM) with representation from all land-managing parts of the DNR, including the SNA Program. SLAM has three desired outcomes:

- *Optimizing the value of DNR's land asset portfolio. Conserving the right lands in the right places.*
- *Improving working relationships with local governments, the legislature, and partner organizations*.
- *Increasing efficiencies in managing DNR lands*.

Department leadership has adopted the following six state level goals for SLAM:

- *Protection of significant natural resources (such as rare resources, groundwater resources, habitats)*
- *Targeted conservation of MN's prairie-grasslands*
- *Consolidation of land ownership, creating larger, more contiguous blocks of DNR lands*
- *Improved access to existing land holdings*
- *More close-to-home outdoor recreational opportunities*
- *Meeting our fiduciary responsibilities on Trust Fund lands*

In 2013, the SLAM Integration Team developed the "Department Decision-making Framework for Prioritizing Lands to Acquire, Sell, or Exchange" with three primary purposes:

- *to help move the department toward more strategic acquisitions that complement our existing public lands and help us achieve our mission,*
- *to assure that the department continues to regularly assess our portfolio of lands in the future and make any necessary improvements, and*
- *to ensure effective, efficient and timely interdisciplinary participation in land asset decisions.*

In 2014, the Department is refining procedures to prioritize land transactions and to measure progress towards meeting SLAM goals. SLAM is also investigating using GIS-based decision support software to identify lands on a state scale that contribute towards each of the SLAM goals.

Implications for the SNA Strategic Plan

The SNA Strategic Plan is very much in line with SLAM – from SNA's state level prioritization to use of a parcel evaluation system and form. Through SLAM each DNR land-managing program is being encouraged to develop spatially defined priorities, the SNA Conservation Prioritization Map (Marxan) is being held up as a model of this. While SLAM is exploring using the Zonation decision support software rather than Marxan, how the results compare to those in the SNA Strategic Plan will benefit both efforts. Improvements to SNA's process for identifying and prioritizing specific lands for acquisition also contribute to both the SLAM and SNAs. As part of future SLAM work, the SNA Program will also be developing a process and criteria for assessing possible disposition (sales or exchange) of its lowest priority lands.

State Wildlife Action Plan

A State Wildlife Action Plan (SWAP) or State Comprehensive Wildlife Conservation Plan/Strategy is required for any state to qualify for monies from the federally-funded State Wildlife Grants program. The State Wildlife Grants Program provides federal grant funds for developing and implementing programs that benefit wildlife and their habitats, including species not hunted or fished. Priority is placed on projects that benefit Species in Greatest Conservation Need (SGCN). These species are defined as animals whose populations are rare, declining, or vulnerable to decline and are below levels desirable to ensure their long-term health and stability. Grant funds must be used to address conservation needs such as research, surveys, species and habitat management, and monitoring, identified within a SWAP.

An approach that different states have used in the development of their SWAPs is the development of Conservation Opportunity Areas as the module of planning. Opportunity Areas provide landscape scale levels of conservancy. Sometimes Opportunity Areas can encompass much larger areas of over 100 miles. SWAPs in other states, such as in Nebraska, sometimes encompass conservation areas (called Biologically Unique Landscapes by Nebraska) that encompass thousands of square miles by establishing priority landscapes that could conserve the majority of the state's biological diversity.

The DNR Division of Ecological and Water Resources is responsible for Minnesota's State Wildlife Action Plan (SWAP). The first Minnesota SWAP (completed in 2006) is a strategic plan focused on managing populations of SGCN. Minnesota is updating its SWAP with the revision due in September 2015 as part of the 10-year federally-required revision process.

Implications for the SNA Strategic Plan

In the SNA Strategic Plan, Conservation Opportunity Areas were developed to be smaller and more local in scale than those developed through other states' SWAPs. Some of this is a function of how

Opportunity Areas are used within SWAPs and how they are used within the SNA Plan. Within SWAPs, the focus is on enhancing biodiversity by managing Species in Greatest Conservation Need. For example, some of these species may have suitable habitat that follows Appalachian ridges for over 100 miles. In Minnesota, land fragmentation, abrupt changes in surface geology, water bodies, and climatic zones tend to reduce the viability of large conservation zones. Marxan has been used by some states to map the core areas of Opportunity Areas within their SWAPs.

While the use of Marxan and Opportunity Areas provides a parallel process for plan development in SWAPs and the SNA Strategic Plan, these planning efforts are not duplicative. In the SNA Plan, biodiversity significance is a primary input into the "coarse filter." Marxan then provides results that delineate high priority areas. However, these areas are not intended to capture every biodiversity site of significance. Smaller sites that may merit protection are too small to warrant their own COA. Within SWAP, the strategy is to map priority habitats of Species in Greatest Conservation Need (SGCN), overlay the results for multiple SGCN within a taxon (e.g. birds, mussels), and then use Marxan to derive a connectivity analysis to determine the best solution. The focus in SWAP is to create a taxon-specific priority habitat prioritization, versus looking at the general biodiversity significance.

The Minnesota 2014-15 SWAP update, while still focusing on particular taxa, is utilizing Marxan in its analysis. The results may inform future iterations of the SNA Plan.

Implementation

The primary purpose of the SNA Strategic Plan is direct to the protection of natural areas through designation of Scientific and Natural Areas. This Plan has identified goals, objectives and targets calling for additional lands to be designated as SNAs.

This section of the Plan lays out the strategies and processes by which designation of SNAs will work towards implementing this Plan. The section starting on page 58 addresses the necessary role partners, landowners, and managers that also play a role in conserving natural areas, biodiversity, and rare natural resources. These partners not only are vital as owners and managers of their own natural areas, but they often provide great assistance to SNA implementation.

Overview of Purpose and Establishment of SNAs

As part of the state Outdoor Recreation Act, Scientific and Natural Areas are explicitly intended to protect and perpetuate in an undisturbed natural state those natural features which possess exceptional scientific or educational value (MS 86A.05, Subd. 5). SNAs are established by DNR Commissioner's Designation Order. Each designation order identifies the lands designated, the natural resource values the SNA is designated to protect, and allowed public uses. By statute (MS 84.033), SNAs can be designated on lands acquired through purchase or gift by the DNR, in fee title or conservation easement, and on lands leased by the DNR. An SNA can also be established as a secondary unit on other DNR-administered lands in the State Outdoor Recreation System. Finally, the peatland SNAs were designated by the Minnesota Legislature through statute (MS 84.036). State law and policies provide a very high level of protection of SNAs. The priority in state management and use is to perpetuate the SNAs' ecological values with particular emphasis on sustaining native plant communities and rare features.

Targeting Lands for SNAs

This Plan provides the tools to be used by the SNA Program in identifying and targeting lands as potential SNAs. Each year, efforts will be initiated for a handful of the Conservation Opportunity Areas. Using the Opportunity Area descriptions in Part 2 of this Plan, the SNA staff and partners will engage local governments and groups in targeted Opportunity Areas to identify the best candidates as potential SNAs. Landowners and land administrators will be approached to ascertain their interest. In many Opportunity Areas, this process of engagement and cultivating interested landowners/managers will take years.

Prospective parcels will be assessed using the SNA Candidate Site Evaluation Guide. Parcels will be further pursued that meet SNA requirements, have a willing landowner, rate well using the SNA Candidate Site Evaluation Guide, are recommended as an SNA in an existing or planned Ecological Evaluation report, and will be able to provide public access.

Acquisition

New SNAs and additions to existing SNAs will primarily be achieved through acquisition of land. Most new SNAs are expected to be fee title acquisition rather than conservation easement or lease. Landowners of qualifying sites are contacted by the SNA Program to determine their interest in selling or donating their land. Acquisition may only be from willing landowners and is highly dependent on funding appropriated by the Legislature. When landowners donate land, not only can that land become an SNA, but the donation generates an equal amount of Reinvest in Minnesota funds to be used to acquire SNAs.

A few DNR-administered School Trust Fund lands contain unique natural area features. If it is in the interest of the Trust, the SNA Program will seek to pay for the value of selected Trust lands, remove the Trust status and transfer administration to SNA. This is done through the DNR acquisition process, including an appraisal of the value of land that must be paid to the Trust.

Acquisition of SNAs (whether by purchase or donation) will follow the DNR's official acquisition process. Prior to moving forward, an acquisition that meets SNA requirements (above) must have its funding identified and departmental approvals made. Each acquisition is dependent upon securing funding for landowner payments, transaction costs, and SNA Program direct costs (staff time and expenses necessary to complete the acquisition as well as costs for developing and publishing designation orders). Before moving forward, an acquisition must also have regional and divisional approvals as per the Strategic Land Asset Management procedures.

Approved and funded proposed acquisitions will be pursued following procedures outlined in DNR Operational Order #6 "Land Acquisition Procedures" and SNA Program Operational Directive #101 "SNA Acquisition and Designation." This may take a year or more. Once the acquisition is complete the property is designated as SNA through a Commissioner's Order published in the State Register.

Designation of SNAs on Lands Owned or Administered by Others

Some lands targeted as priorities for protection of natural areas are likely to be already in public ownership or owned by organizations dedicated to conservation. The SNA Program is very interested in exploring land protection options with the administrators of these lands. In particular, the Program is interested in opportunities to designate SNAs on these lands where mutually beneficial.

Lands already owned or administered by the DNR (other than school trust fund lands) may become an SNA as a secondary unit in the State Outdoor Recreation System or their administration may be transferred to the SNA Program through a Transfer of Administrative Control (TAC). Responsibility for lands now owned or administered by another state agency may be transferred to the DNR and become an SNA through a Transfer of Custodial Control (TCC). By law, SNAs may be designated on lands where the DNR's ownership interest is a conservation easement or lease, with the fee ownership being

retained by another public or private owner. Typically, SNA designation is considered a higher level of protection than other forms of ownership in the state.

When such projects are of potential mutual interest, they will be pursued following procedures outlined in SNA Program Operational Directive #102 "SNA Designation of Lands Owned or Administered by Others." After a TAC, TCC, conservation easement or lease is executed, the property is designated as SNA through a Commissioner's Order published in the State Register. The specific responsibilities and procedures involved with these approaches to designation are outside the scope of this Plan.

Management and Use of SNAs

Protection of an SNA's natural features is just beginning with the action of designation as an SNA. Natural features need ongoing monitoring and management to protect them from damage by invasive species, trespass, or inappropriate uses. This may include using management practices such as prescribed burning to simulate natural disturbances necessary to sustain some ecosystems and posting of boundary signs. Public use of SNAs is aided by modest parking areas, interpretive signs, and public outreach and education.

Once sites are designated as SNAs, responsibility for their administration and management belongs to the SNA Program. Funding and staff resources are necessary to meet standards for SNA restoration, enhancement, and development. The SNA Program greatly relies on partner organizations and a network of volunteer site stewards to help care for SNAs.

The SNA Program administration is directed by DNR Operational Order #29. The Operational Order authorizes creation and use of the *SNA Program Administrative Handbook* to contain a series of operational directives. The *SNA Program Administrative Handbook* (under development) will contain four sections (or chapters) as follows: (1) Land Protection and Acquisition (including directives on naming conventions, land divestiture, etc.); (2) Natural Resource Restoration and Management (including directives on seed collection and use, control of invasive species, prescribed burning, etc.); (3) Facility and Public Use Management (including directives on signs, parking facilities, site clean-up, etc.); and 4) Administration and Coordination (including directives on management plans, conservation easement stewardship, site stewards and volunteers, etc.).

De-Designation of SNAs

In a vast majority of situations, the protection of resources through SNA designation is expected to be in perpetuity (i.e., as long as the State of Minnesota owns and manages land). Inevitably, infrequent situations will arise in which the natural resources no longer exist that the SNA was designated to protect. This may occur due to natural or ownership issues. For example, a lease allowing SNA designation may be terminated. Climate change and uncontrollable invasive species may so substantially alter and degrade a site's habitat that it no longer qualifies as an SNA.

In such cases, the SNA Program needs to have a process for removing SNA designation from a property (i.e., de-designation). This requires a public hearing and Commissioner's Order de-designating all or a portion of an SNA. An SNA Program Operational Directive on "Changes in SNA Designation and Divestitures" is proposed. When this happens, the DNR will strive to find a more appropriate public land managing entity or a conservation buyer.

Partners in Conserving Natural Areas

The conservation of natural areas depends on their ownership and management. These special places may be protected by virtue of their ownership when laws or policies are in place specifically protecting the natural area values. This protection can occur through acquiring the land in fee (full land ownership) or by acquiring a conservation easement putting conditions on the land to protect its natural area values. Typically, the owner of a "protected" natural area is a unit of government or a conservation organization. How well the natural area values are sustained will depend on the purposes for that ownership as well as the management practices for that type of land. In addition, state and federal law limit the destruction of the listed endangered and threatened species.

The future of natural areas and rare natural features depends upon conservation across all ownerships. Individuals and organizations across all ownerships are strongly encouraged to use this Plan to do their part in conserving the state's natural areas and rare resources.

This section of the Plan discusses how land protection and other conservation tools implemented by a range of landowners and managers can work towards sustaining natural areas. How these programs or partners compare with SNA designation is indicated. This discussion is not all-inclusive.

Other DNR Natural Area Conservation Tools and Lands

Native Prairie Bank

The SNA Program is responsible for Native Prairie Bank conservation easements. Through Native Prairie Bank, the DNR acquires a partial ownership interest from the landowner who retains the underlying fee title ownership. By statute (MS 84.96), to qualify to be a Native Prairie Bank easement, the land must be native prairie that has never been plowed and has no more than 10% tree cover. The landowner agrees to manage the land under an easement in ways that protect the native prairie in exchange for an upfront, one-time payment.

To date, all Native Prairie Bank easements are permanent. Each easement is tailored to the unique character of the land and desires of the landowner, with common protection features, such as no plowing or building on the native prairie. The easement leaves fee ownership in the hands of the property owners who may continue to enjoy it, manage it as part of their working farm, sell it, or pass it down to heirs. However, the easement remains in place between the State and all present and future

landowners. The SNA Program takes an active role in managing these easements' native prairie, including prescribed burning and removal of trees and brush encroaching on the prairie. About 107 Native Prairie Bank easements protect about 8600 acres.

Comparison to SNA

NPB cannot be used on all habitat sites, even including places such as savannas with native prairie grass understory and over 10% tree cover. The level of protection and ownership status is similar between NPB and SNAs in which DNR's ownership is limited to a conservation easement. However, NPBs are not part of the Outdoor Recreation System providing public access. State law also provides SNAs with some higher level of scrutiny in environmental review due to proposals such as transmission line crossings.

Natural Area Registry

The SNA Program maintains the Natural Area Registry (NAR) of registered public sites that are managed to protect rare features and related natural resource values. The Division of Ecological and Water Resources (EWR) enters into a Natural Area Registry agreement with another division of the DNR or another state, federal, or local unit of government for sites to be managed to protect native plant communities and rare features. The NAR agreement identifies the site, explains its significance, describes a proposed management direction, and states that before any management contrary to that direction may occur, the parties who signed the agreement will discuss that proposed management activity.

The intention of a NAR agreement is to protect the site's native plant communities, populations or concentrations of rare species, or critical animal habitat, and to guide land management towards protection of those resources. In conjunction with forest certification on DNR lands, department policy calls for NARs to be developed for each identified Representative Sample Area in order to protect targeted native plant communities. About 42 NAR agreements guide conservation of native plant communities and rare resources on about 7770 acres.

Comparison to SNA

NARs are considered a non-binding voluntary agreement rather than a permanent level of protection. NARs are not explicitly authorized in statute and thus are vulnerable to changing administrations and reductions in funding to administer them.

Parks and Trails

The DNR Division of Parks and Trails (PAT) is responsible for development, administration, and management of the following state lands within the state Outdoor Recreation System. Of these, state parks and state recreation areas (totaling about 230,000 acres) provide the primary opportunity for conserving natural areas.

- 24 multi-use state trails
- 76 state parks and recreation areas, 8 waysides, and 56 state forest campgrounds and day use areas
- Over 1,550 public water access sites
- 360 fishing piers and shore fishing sites
- 33 water trails with over 4,400 miles of paddling opportunities

PAT has a Natural Communities Restoration and Management Program whose purpose is to improve the quality of natural plant communities, wildlife habitat, and regional landscape integrity, enhancing the recreation experience and raising awareness of the state's natural heritage. Program responsibilities include the following:

- Identify, preserve and manage natural plant communities.
- Minimize construction damage and vegetate disturbed areas with native plants that are ecologically appropriate for the area.
- Interpret natural plant communities and management practices to the recreating public.

Comparison to SNA

State Parks have higher levels of recreational use and greater expectation and authorization for developed recreational facilities. State Recreation Areas are typically intended for more intense recreational use (and facilities). State Parks and State Recreation Areas are constrained in protecting dispersed natural resources since they may only acquire land within their statutory boundary.

State Forests

Minnesota's 58 state forests (comprising about 3.1 million acres) are units under the state Outdoor Recreation System established to produce timber and other forest crops, provide outdoor recreation, protect watersheds, and perpetuate rare and distinctive species of native flora and fauna. The DNR applies multiple-use management including timber harvesting, reforestation, wildlife habitat improvement, and recreational development. Wildlife management includes creating permanent openings in the forest to produce forage for white-tailed deer and planting shrubs to produce seeds and berries to benefit birds. The DNR also protects the forest and surrounding areas from wildfires. Within state forests, old growth forest designation and forest certification are leading to more explicit conservation of natural areas on targeted stands of native plant communities (see below).

Comparison to SNA

State Forests are actively managed for multiple purposes with focus on producing commercial forest products. A greater array of recreational uses is allowed on state forests including trails for motorized use in some areas of the state.

Other Forestry Administered Lands

The DNR Division of Forestry also administers about 700,000 acres other state lands owned in fee that are outside of State Forests. A majority of this land (and some within State Forests and Wildlife Management Areas) is administered by the Department for the School Trust Fund. The state's obligation in managing School Trust Lands is to maximize the long term financial benefit of these lands to school districts of the State.

In addition, the Division of Forestry administers 38 permanent conservation easements on 351,000 acres through the Forest Legacy and Forests for the Future Programs. The purpose of these easements is to protect environmentally important private forests threatened by conversion to non-forest uses. The landowner retains fee ownership and can continue activities such as timber management, recreation, hunting, and hiking as long as they do not conflict with the terms of the easement. The easements range from smaller remnants of native Big Woods Forest in southeastern Minnesota to large tracts of industrial forest land managed for timber production in northern Minnesota.

Comparison to SNA

School Trust Fund Lands must be managed for long term income generation; all other values of these lands are secondary to financial obligations to the trust. Forestry conservation easements generally allow active forest management and may or may not allow public access and motorized use as dictated in the particular easement terms.

Wildlife Management Areas

Wildlife management areas (WMAs) are part of state Outdoor Recreation System established to protect those lands and waters that have a high potential for wildlife production, public hunting, trapping, fishing, and other compatible recreational uses. A total of about 1,440 WMAs encompassing 1.29 million acres are administered by the Section of Wildlife within the Division of Fish and Wildlife. WMAs contain over 65,000 acres of native prairie – an estimated 28% of all remaining native prairie in Minnesota and over half the acres of native prairie in public ownership.

WMAs are the backbone of DNR's wildlife management efforts in Minnesota. Much of the wildlife managers' work is directed toward protecting and enhancing wildlife habitat on WMA lands. For instance, grasslands are planted to provide prime nesting cover critical to waterfowl and pheasant production. Wetlands are restored and enhanced to benefit waterfowl and other wetland wildlife species. Prescribed burning is done to maintain grasslands, prairies, and brush lands is important to sharp-tailed grouse and prairie chickens. Forest openings and regeneration projects benefit ruffed grouse, wild turkeys, deer, and moose. Wildlife food plots are managed to feed both resident and migratory wildlife. Woody shelter belts are planted to provide winter cover and nesting sites for upland birds and a variety of nongame species as well.

Comparison to SNA

Wildlife Manager Areas may be actively managed for wildlife food and cover and using water control structures and other management practices to favor game species. State law also provides SNAs with some higher level of scrutiny in environmental review due to proposals such as transmission line crossings.

Aquatic Management Areas and Trout Streams Easements

The Fisheries Section of the Division of Fish and Wildlife administers two types of land which protect some riparian and aquatic natural areas. First, Aquatic Management Areas (AMAs) are part of the state Outdoor Recreation System established to protect and manage shoreland habitat, lakes, rivers, streams, and adjoining wetlands that are critical for fish, other aquatic life, water quality, fishing, and non-motorized public uses. Currently, 915 AMAs protect over 42,760 acres and 980 miles of shoreline.

Second, the DNR has established over 545 miles of public fishing conservation easements along Minnesota's trout streams. Generally, easement corridors encompass 66 feet of land and water on either side of the centerline of the stream. Easements permit angler access, provide corridor protection, and allow the DNR to conduct habitat improvement activities if needed. Landowners retain ownership of the land and all rights not restricted by the easement.

Comparison to SNA

AMAs and Trout Stream Easement are not explicitly intended to protect terrestrial natural areas, but rather are predominantly to provide or support fish populations and fishing activities. Most often they are limited to riparian corridors. The Fisheries Section also does not typically have the staff resources or expertise oriented to conserving terrestrial native habitats (e.g. prescribed burning, buckthorn control, etc.).

High Conservation Value Forests

Forest lands in State Forests and WMAs are the focus of DNR's efforts to provide certified forest products through dual certification from the Forest Stewardship Council and the Sustainable Forestry Initiative. In particular, forest certification requires the DNR to identify high conservation value forests (HCVFs) as *"areas of outstanding biological or cultural significance"* to be managed for rare species, communities, and features. The Department's interim HCVF approach is to (1) manage all Minnesota Biological Survey (MBS) Outstanding Sites as interim HCVFs, (2) manage all MBS High Sites as interim HCVFs until a subset of high sites are identified, and (3) conduct an analysis to identify which high sites will be managed as HCVFs in the long-term.

Comparison to SNA

HCVF is a management status reinforced forest certification rather than a form of permanent protection of natural areas. It is based on DNR policy rather than legislative direction and thus is vulnerable to changing administrations, priorities, and funding.

Old Growth Forest

The DNR has designated "Old Growth Forest" status on about 44,000 acres of DNR administered lands. Old-growth forests are natural forests that have developed over a long period of time, generally at least 120 years, without experiencing a severe, stand-replacing disturbance: a fire, windstorm, or logging. Designated old-growth forest is protected as long as they maintain their old-growth characteristics. In order to sustain these forests' rare habitat for plant and animal species and to protect their structural complexity and unique natural characteristics, old-growth forests are managed within the context of the larger forest landscape. Management of old-growth forests and adjacent lands may involve prescribed burning for forest types that require natural disturbance processes for tree regeneration, control and removal of exotic species, monitoring damage due to blowdowns, designing special harvest plans for lands around and between old-growth forests, conducting research in old-growth and old forests, and monitoring changes in old-growth forests compared with harvested forests.

Comparison to SNA

Old growth is a management status reinforced forest certification rather than a form of permanent protection of natural areas. It is based on DNR policy rather than legislative direction and thus is vulnerable to changing administrations, priorities, and funding.

Other Units of Government and Tribal Lands

Lands owned and managed by other units of government and tribal entities contain a high percentage of the state's natural areas and habitat for rare species. For example, nearly all of the Nett Lake Peatland are lands managed by the Bois Forte Band of Chippewa.

Local units of governments (county, township, and city) play a key role in conserving and managing natural resources. Of particular note are those park and open space systems which explicitly protect natural areas managed for the native habitat values. Examples of these are the City of Duluth Natural Area system, the park reserves of several metropolitan counties (such as Three Rivers Park District), and county natural area protection programs (such as in Dakota and Washington Counties). Extensive areas in some northern counties are managed by their land commissioners primarily for timber production and revenue, but also with natural resource conservation such as when these county lands have forest certification.

Reinvest in Minnesota conservation easements held by the state Board of Water and Soil Resources are largely agricultural lands without native plant communities. Nonetheless, statewide, their easements protect over 1,700 of native prairie.

Comparison to SNA

The authority of other governmental units to permanently protect natural areas is highly variable. In some cases, their status is based on policy rather than state law or local ordinance and thus is vulnerable to changing administrations, priorities, and funding. Lands protected through permanent conservation easements may be similar to SNAs in which DNR's ownership is limited to a conservation easement, but ONLY if the easement's conservation values and easement terms (restrictions) are the same as SNAs. This is usually not the case. Also, most easements do not provide for public access.

Federal Lands and Easements

Several federal agencies are key players in conserving natural areas in Minnesota, including the following.

The U.S. Department of Agriculture (USDA) contains the Forest Service which manages two national forests. The Forest Service establishes Research Natural Areas (RNAs) within national forests to help protect biological diversity at the genetic, species, ecosystem, and landscape scales. The Superior National Forest, comprising 3 million acres, includes four established RNAs protecting 2100 acres, and the Boundary Waters Canoe Area Wilderness containing over 1 million acres which is largely undisturbed natural habitat. The Chippewa National Forest is over 660,600 acres and contains 4 RNAs protecting 1900 acres. Several dozen proposed or candidate RNAs have also been identified in Minnesota. Also, within the USDA is the Natural Resource Conservation Service holds perpetual Wetland Reserve Program (WRP) easements intended to protect, restore, and enhance wetlands. Nonetheless, WRP easements in Minnesota protect over 3,300 acres of native prairie.

Federal ownerships administered by the U.S. Department of Interior's National Park Service contain significant natural areas and habitat for rare species, including the 218,000 acre Voyageurs National Park and the St Croix Wild National Scenic Riverway. This protects over 255 miles of river shore in Minnesota and Wisconsin (including federal land ownership plus many federally-held conservation easements).

The U.S. Fish and Wildlife Service (USFWS) administers 13 federally-owned National Wildlife Refuges in Minnesota totaling more than 216,000 acres. These are managed to provide habitat for populations of fish and wildlife, including game and rare species. The USFWS also manages more than 273,000 acres of Waterfowl Production Areas and wildlife habitat conservation easements. WPAs conserve habitat for waterfowl, shorebirds, grassland birds, plants, insects and wildlife. Federally owned WPAs also provide public access for wildlife-dependent recreation such as hunting, wildlife watching and photography.

Comparison to SNA

U.S. Forest Service RNAs have similar purposes as SNAs, but are based upon policy and may not be as permanent as SNA designation. Thus they may be vulnerable to changing administrations, priorities, and funding. The BWCA is also somewhat similar to SNAs in purpose, but with less resource management needs and issues. Some uses differ, e.g., in the allowance of camping, campfires, etc. within the BWCA. The Voyageurs National Park has some traits of State Parks (see above) and some of SNAs. Lands protected through permanent conservation easements by federal programs are typically not oriented towards protection of native plant communities and rare features. They are not likely managed for those purposes and have little or no staff resources or expertise oriented to conserving native habitats (e.g. prescribed burning, buckthorn control, etc.). Lands administered by the USFWS are more similar to WMAs with Areas may be actively managed for wildlife food and cover and using water control structures and other management practices to favor game species.

Private Conservation Organizations

Private, non-profit organizations with a natural resource conservation mission are key in protecting native habitat by being landowners, conservation easement holders, or in helping public agencies acquire conservation lands.

Private, non-profit organizations have gifted or assisted in the acquisition of many SNA sites. The Nature Conservancy (TNC) has donated many sites that are SNAs. TNC also owns all the land leased by the DNR and designated as 14 SNAs, comprising about 5400 acres. Other non-profit donors of SNAs include the Izaak Walton League and The Trust for Public Land (who also helps acquire many SNAs). Other non-profits also lead the restoration and enhancement of plant communities at many SNAs, including Friends of the Mississippi River and Great River Greening.

The Nature Conservancy also owns and manages 57 preserves in Minnesota comprising over 70,000 acres which are managed comparably to DNR SNAs. The Minnesota Land Trust is the largest non-profit holder of conservation easements in Minnesota – the purpose of many of those easements is to protect the property's natural habitat values. However, sustaining the habitat depends on the landowners commitment and resources to undertake management such as invasive species control.

Many other non-profits also own and manage nature centers, wildlife habitat, campground/retreat centers, etc. which may contain native plant communities and rare resources.

Comparison to SNA

The authority and level of commitment of private conservation organizations to permanently protect natural areas is highly variable. In some cases, their status is based on policy rather than legal constraints and thus is vulnerable to changing administrations, priorities, and funding. Lands protected through permanent conservation easements may be similar to SNAs in which DNR's ownership is limited

to a conservation easement, but ONLY if the easement's conservation values and easement terms (restrictions) are the same as SNAs. This is usually not the case. Also, most easements do not provide for public access. Functionally, TNC Preserves are very similar to SNAs, but without the same legal standing and level of protection.

Conservation By Private Individuals/Landowners

Many of the state's most outstanding natural areas and unique natural features are owned by private individuals and families. These include people who are very dedicated conservationists who intend to continue to own and manage their land indefinitely. Their work is very important and is highly commended. This Plan is intended to help inform and inspire private landowners to conserve their native plant communities and rare features on their lands. Some forms of landowner assistance are available through the DNR and volunteers such as Master Naturalists. Landowners interested in protecting their lands natural resources in perpetuity can contact The Minnesota Land Trust about a conservation easement or any number of conservation organizations about other land protection options.

Comparison to SNA

Conservation by individuals is generally voluntary rather than a permanent level of protection. Individuals and families may have a very high level of commitment. But that may change when the land changes hands through sale or inheritance or if the owner's financial or health situation changes. Lands protected through permanent conservation easements may be similar to SNAs in which DNR's ownership is limited to a conservation easement, but ONLY if the easement's conservation values and easement terms (restrictions) are the same as SNAs. This is usually not the case. Also, most easements do not provide for public access.

Conclusions and Future Work

This interim version of the SNA Strategic Land Protection Plan provides the state and its partners with specific tools to use in protecting natural areas and places with rare resources. A science-based methodology prioritizes areas of biodiversity significance at a state scale. Conservation opportunity areas focus the work of the SNA Program and partners on the highest priority landscapes rich in natural areas and rare species. A site specific evaluation tool scores the suitably and priority of candidate parcels for SNA designation.

The methodologies used require reasonably complete ecological survey data to be most effectively applied. Therefore, landscape level priorities have been identified throughout the state in those subsections where the Minnesota Biological Survey has completed their survey, plant community mapping, and biodiversity area delineation work.

Future Work

As Minnesota Biological Survey work is completed, the SNA Plan will be updated, including the eight ecological subsections in north central Minnesota not completed in this interim plan. Marxan analysis will identify the priority areas which would most efficiently protect the biodiversity and native communities. Then Conservation Opportunity Areas will be defined in these subsections. As additional ecological survey work is done in other parts of the state, results may be refined for those areas as well.

Additional Input Layers

Marxan can use a variety of data as inputs. Polygons, or data mapped in a continuous surface, are most commonly used. However, point data can also be used. Therefore, data, such as rare species and element occurrences (contained in Biotics and the Natural Heritage Database) could also be considered as primary inputs along with biodiversity significance and S1-S2 ranked plant communities. However, caution is needed. Using data types that are too closely related may cause a result that is *auto correlated,* i.e. the data inputs take on greater importance than they should since they have been essentially duplicated in the input process. As an example, Species in Greatest Conservation Need contain endangered, threatened, and special concern species. To use both layers could introduce repetitive importance to these data.

Additional Revisions to the Marxan Approach

Marxan was used to develop a biologically-based priority of conservation areas. Primary conservation inputs were biodiversity significance and state-ranked plant communities. Threat inputs were minimized, and only one primary opportunity cost type was used for each subsection. However, as discussion evolved through the planning process, a number of stakeholders expressed the interest in seeing how the prioritization would respond to removing lands already protected.

The current approach did not deduct a parcel's value if it were already within State or conservancy ownership. This was done for several reasons: (1) to achieve a purely biologically-based result, where each parcel is prioritized by how it contributes to an optimal solution set of conservation features, regardless of ownership; (2) to compare the results to other planning efforts by other entities; (3) to consider how further conservation actions on existing public lands or other ownership types; and (4) to aide Strategic Land Asset Management which is addressing sales and exchanges of DNR lands as well as acquisitions.

A future optional approach would be to either "lock out" existing state, federal or conservancy lands from the solution set or setting their opportunity costs at a high level. Then Marxan will look elsewhere to find parcels that more satisfactorily or efficiently solve the solution set. This method would prioritize sites outside of state, federal, or conservancy ownership, and would identify new opportunities. However, this may also steer solutions toward sites that are more isolated, and a more broken-up solution set is created instead of one that creates massed prioritization areas at a landscape scale. A massed solution may provide better utility for species migration, reduced edge effect, and may provide more partnering opportunities when multiple partners have a common interest in the same opportunity area.

On the other hand, using a locking out approach may redirect attention to new focal areas that have been overlooked by previous planning efforts. This is one of the intentions of Marxan, to see how responses to inputs create new relationships and linkages. The value of Marxan's ability to illustrate how systems can be developed is not to be underestimated. Adapting this tool to different prioritization scenarios is a highly appropriate way to utilize it.

Extending the Reach of this Plan

This Plan is a tremendous resource for anyone interested in conserving natural areas, places of biodiversity, and rare resources. Other organizations and individuals are urged to apply the results of the Plan in their own work. The Conservation Opportunity Areas are intended to be foci of collaborative efforts and multiple approaches to land protection.

Within the DNR, the Plan will feed into interdisciplinary Strategic Land Asset Management and will lead to conversations about providing higher levels of protection to rare resources within state ownership. Its implementation will be coordinated with the State Wildlife Action Plan. The Plan and its methodologies are intended to be shared.

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